

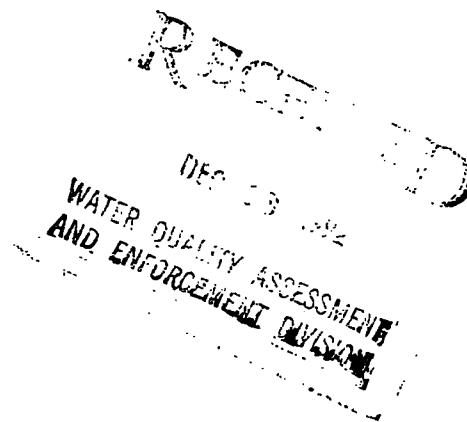


POST,  
BUCKLEY,  
SCHUH &  
JERNIGAN, INC.

ENGINEERING  
PLANNING  
ARCHITECTURE

December 18, 1992

Ms. Gail Rawls Jeter  
Enforcement Section  
Bureau of Solid and Hazardous  
Waste Management  
SCDHEC  
2600 Bull Street  
Columbia, SC 29201



RE: **Groundwater Assessment Report**  
**King's Laboratory, Inc. Site**  
**Blythewood, S.C.**  
**PBS&J No. 18-082.10**

Dear Ms. Jeter:

Attached is the referenced assessment report for the King's Laboratory facility in response to Administrative Consent Order 82-01-W-SW, as amended, and succeeding Department correspondence. We anticipate that this document will provide a solid foundation for further site work and remedial actions.

Sincerely,

**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**

A. Michel Pelletier, P.G.  
Senior Hydrogeologist

AMP/clf

cc: Al Montgomery, KLI  
Ginger Clark, PBS&J  
Tom Knight, SCDHEC (with copy of report)  
Paul Bristol, SCDHEC (with copy of report)

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## Section 1

### INTRODUCTION

#### 1.1 PROJECT LOCATION

King's Laboratory, Inc. (KLI) is a manufacturer of specialty chemicals, and is located approximately one mile west of Blythewood, SC (Figure 1) on S.C. Highway 59. The plant facility occupies a parcel of land approximately 300 feet by 400 feet (approximately 2.8 acres) and contains seven buildings that house the operations of the plant.

#### 1.2 PROJECT HISTORY

In August, 1982, KLI received an Administrative Consent Order (ACO Number 82-01-W, SW) from the South Carolina Department of Health and Environmental Control (DHEC) requiring: the submission of plans for the assessment of soil and groundwater contamination; the implementation of those plans; and the appropriate remediation of the soils and groundwater, if necessary. On October 2, 1982, the soil assessment plan was submitted to DHEC for review. The assessment plan was implemented on December 7, 1982, after receiving comments from DHEC on October 20, 1982. On December 23, 1982, the plan to assess groundwater contamination was submitted, and it was approved on March 1, 1983. Monitoring wells 1, 2 and 3 were installed and sampled during May, 1983. The assessment reports for the soil and groundwater investigations were submitted on February 8, 1983 and August 30, 1983, respectively. Approximately 320 cubic yards of soils were removed during late 1983 and early 1984, according to the approved soil assessment report.

On June 5, 1984, the ACO 82-01-W, SW was amended to require additional characterization of site groundwater and wastewater, and the removal of additional soil volumes. A fourth monitoring well (MW-4) was installed on or about September 27, 1984, and groundwater was sampled from it, along with the other three wells and the seep (or spring) north of the facility. A report was submitted to DHEC on November 20, 1984. Based on the results of the phases of work to date, KLI submitted a second groundwater assessment proposal to DHEC on September 18, 1985, proposing to further evaluate the local groundwater impact, including the impact to the adjacent property to the north. In October 1985 and February 1986, additional soil

volumes were excavated from the site until confirmation sampling indicated levels below the DHEC-mandated cleanup goals.

At the conclusion of lengthy negotiations to obtain access for the off-site work, the expanded groundwater assessment was implemented, and wells MW-5, 6 and 7 were installed during March 1988, with several samples collected from the seven site wells. No report of findings was issued, pending full implementation of the assessment plan following a year's sampling activities.

On December 13, 1988, the ACO was amended for the second time, to require the submission of the assessment report by January 12, 1989, using the currently available data. The report was submitted to DHEC on January 31, 1989.

Additional negotiations with the adjacent property owner resulted in the installation of three new monitoring wells (EDW-1, EDW-2, and EDW-3) in April 1989 for the purpose of establishing a "clean line" for future development work. These well locations were selected by a consultant for the property owner, but were installed at KLI expense with KLI geologic oversight personnel.

On June 26, 1989, KLI responded to the DHEC comments addressing the January 1989 report, and proposed further work to address those comments more fully. This work plan involved additional off-site well locations and required further negotiations with the owner of the adjacent property. Approval of the expanded work plan, with conditions, was received from DHEC on November 28, 1989, and work proceeded to locate well sites in the field, retain a drilling subcontractor, and obtain site access. Site access was denied on July 18, 1990.

On August 20, 1991, KLI submitted a revised proposal to DHEC which recommended Hydrocone locations on the adjacent property as an alternative to permanent wells, and included a stream survey and slug tests in all wells. The revised plan was approved by DHEC, with conditions, on May 5, 1992, and KLI submitted a schedule of implementation on September 18, 1992. The field work was accomplished during October and November 1992 to produce this report.

### 1.3 PROJECT PURPOSE AND OBJECTIVES

The purpose of this revised and expanded groundwater assessment is to further investigate the nature and extent of contamination in the uppermost aquifer at the KLI facility and to provide a basis for conducting effective remedial actions at the site. A wide range of specific objectives to be addressed by the assessment were identified in the work plan and subsequent correspondence with regulators. These objectives, and specific methodologies to achieve them, include the following:

1. Evaluate the nature of contaminant sources to the groundwater:
  - a. Develop a list of products, by-products, process chemicals and other compounds historically used, stored or disposed on site by KLI.
  - b. Evaluate chemical analyses from the KLI septic tanks for the potential of those tanks to continue to deliver contaminants to the water table.
  - c. Locate the septic tank tile fields to assess the efficacy of the monitoring well network.
  - d. Conduct Appendix IX analyses on groundwater samples from MW-2 and MW-4.
  - e. Collect soil samples to confirm the volatile and semi-volatile tentatively identified compounds (TICs) found by DHEC in November of 1990.
  - f. Survey the location of the current NPDES permitted outfall.
2. Evaluate the horizontal and vertical extent of contaminants in the subsurface:
  - a. Prepare a new base map with topography, streams, buildings, monitoring wells, and other significant features.

- b. Collect Hydrocone samples from the adjacent property to the northwest, north, and northeast of the existing on-site monitoring system. Use a field GC unit, in concert with the Hydrocone rig, to facilitate Hydrocone placement decisions while still in the field.
  - c. Install a monitoring well (MW-8) on the west side of the KLI operations area.
  - d. Collect water quality samples from all on-site and off-site monitoring wells.
3. Conduct a preliminary analysis of the fate and transport of site-related contaminants:
- a. Conduct slug tests in all wells to obtain hydraulic conductivity measurements.
  - b. Measure hydraulic conductivity of the formations with the Hydrocone, while collecting water samples.
  - c. Construct water table maps and sections to obtain flow directions and gradients.
  - d. Investigate bedrock fracture patterns for evaluating zones and directions of preferential flow in the bedrock aquifer.
  - e. Discuss appropriate methods to investigate the vertical extent of contamination in the bedrock.
4. Assess the local surface water bodies for the impacts of groundwater discharge:
- a. Conduct a survey of the stream to locate areas of elevated conductivity where the plume may be discharging to the stream.
  - b. Locate all seeps and springs within a half-mile radius north of the facility.

- c. Collect water samples for analysis.
  - initiate quarterly sampling of surface water locations
  - duplicate the sample collected by DHEC in February 1991
  - include metals analyses

- 5. Evaluate the potential risk for local receptors:
  - a. Conduct a well inventory within a quarter-mile radius of the site.
  - b. Prepare a preliminary risk characterization of the local surface water exposure pathway.
- 6. Develop an understanding of the local hydrogeologic system at the site:
  - a. Draw maps, sections and other figures to present the major features of the local system.
  - b. Clarify the completion zone of MW-5.

## Section 2

### STUDY AREA SETTING

#### 2.1 PHYSIOGRAPHY

The KLI facility is located in northern Richland County, South Carolina, approximately 0.5 miles west of the intersection of SC Highway 59 and Interstate 77. The site occurs almost directly on the Fall Line, the boundary between the Coastal Plain and Piedmont Physiographic Provinces (Figure 2).

The Coastal Plain province extends from the Fall Line, near the KLI facility, to the coast, and covers approximately two-thirds of South Carolina. The Coastal Plain province features topography that is flat to gently rolling and that is locally incised by streams to produce areas of relatively greater relief. The geologic materials underlying the local portions of this province are composed of variable amounts of gravel, sand, silt and clay, and can be highly permeable.

The Piedmont Physiographic province covers the northwestern third of South Carolina and features topography that is more rugged than that of the Coastal Plain. Stream density is also higher than the Coastal Plain, because of the lower permeability of the silty and clayey soils common to the region. These soils, called saprolite, are the result of the deep in-situ chemical weathering of the parent rocks of the province, and they commonly retain relict structures found in the unweathered rocks.

#### 2.2 REGIONAL GEOLOGY

##### 2.2.1 Piedmont Geology

The soils of the Piedmont to the north of the subject site are underlain by rocks of the Carolina Slate Belt, which are comprised of a thick sequence of volcanic flows, tuffs, tuffites, and graywackes. These rocks have been subjected to a very low rank of metamorphism, with many exposures showing no metamorphic effects. A number of basalt dikes have been found to cross the area, with an orientation of N 20° to 30° W, which is roughly parallel to the orientation of similar dikes found in other parts of South Carolina.

The Slate Belt rocks are indurated and brittle and have been highly fractured. Many of these fractures are evident as linear traces on topographic maps and aerial photographs and are important for their ability to transmit groundwater more effectively than the rock mass as a whole. Figure 3 is a map of fracture traces, as determined from an inspection of the Blythewood and Irmo NE topographic quadrangle maps within the mapped area. The orientation frequency diagram for those fractures is presented in Figure 4. As shown on Figure 4, the predominant fracture orientation is N 45° E (6.4%) with a sub-orthogonal set at N 60° W (4.8%). A secondary set is oriented N 85° E (6.0%) with an orthogonal set at N 5° W (4.0%). This pattern of two sets of sub-orthogonal fracture pairs is a common occurrence in areas of fractured bedrock.

The strike of the foliations shown on the geologic map closely resemble the orientation of the NW-SE set of fractures that are sub-orthogonal to the principal fracture orientation of N 45° E. No nearby exposures of in-place piedmont rocks were noted during the field work, although the change from Coastal Plain to Piedmont soils was noted along a dirt road due north of the EDW-2 location. Abundant angular quartz float was noted in eroded tire ruts of the clay road bed there, but within a few feet of rise, the road bed became a deep sand with no evident quartz float.

### 2.2.2 Coastal Plain Geology

Southeast of the Fall Line lie the sediments of the Middendorf Formation. This formation lies unconformably on the Piedmont (Carolina Slate Belt) units and is composed of sand, gravel, silt and clay of Late Cretaceous age. Two divisions have been identified within the Middendorf Formation near the subject site and have been designated by Paradeses et. al. (1966) as the upper and lower units. The lower unit is usually composed of moderately indurated medium to coarse grained sand that is usually coarser-grained than the rest of the formation. This unit contains beds of clay (Kaolin) that are locally minable and that can reach up to seven feet in thickness. Kaolin also occurs as a matrix throughout the sandy portions of this unit. The upper unit is much less indurated than the lower unit and is also composed of medium to coarse sand. The clay content of this unit is much less than that of the lower unit, and the clay commonly occurs as a matrix within the sandy portions of the strata.

## 2.3 SOILS

The two principal soil types that occur at the KLI study area are strongly influenced by the underlying geologic formations from which they developed. Over the rocks of the Carolina Slate Belt, lie the clayey soils of the Nason and Georgeville map units. The Coastal Plain deposits are overlain by soils classified as Lakeland, Blanton, Fuquay, Troup, and Pelion.

On the ridgetops, where the Coastal Plain sediments lie, the predominant soil types are Lakeland, Blanton, Fuquay and Troup, which are classified as well-drained to excessively drained, highly permeable, sandy soils. The Pelion soils appear on toe-slopes along valley walls, and probably represent down-slope deposits eroded from the sandy ridgetops and that possibly overlap onto Piedmont units.

The soils of the Nason and Georgeville units are well to poorly drained clayey soils, with lower permeabilities than those soils over the Coastal Plain deposits. They are generally red to reddish yellow or yellowish-red in color.

Figure 5 is a map of the various soil units around the study site. As can be seen, the division between the Nason-Georgeville units and the units developed on the Coastal Plain deposits closely mimics the Fall Line shown on the geologic map (Figure 2). The differences in the location of the line on the two maps results from both the lack of good rock exposures in the area for detailed geologic mapping, and the differences in the objectives and methods used in generating the two different maps. The downslope transport of erosional material from the ridgetops has also covered the contact between the principal soil types, thereby making the distinction even more difficult in the field.

## Section 3

### INVESTIGATION METHODS

The investigation methods as proposed in the August 1991 Work Plan were approved by DHEC staff, with conditions. All work accomplished during this investigation was conducted in conformance with that plan and the accompanying conditions as related in subsequent correspondence with DHEC staff. Details of specific procedures are included in that proposal document. The investigation covered three principal thrusts to characterize: the sources of contamination in the subsurface; the principal features of the subsurface that govern fate and transport of the contaminants; and the principal potential receptors of those contaminants.

#### 3.1 SOURCE CHARACTERIZATION

In order to develop an understanding of the sources and types of site-related groundwater contaminants, a five-step investigation was conducted.

1. Conduct a Process Review to develop an understanding of the activities carried out in each area of the plant and to assess the potential for those activities to have created releases to the environment.
2. Develop a list of principal chemical compounds and waste materials generated, stored or handled on site.
3. Assess the operating septic tanks for their potential to continue to release compounds to the environment.
4. Sample soils for compounds thought to be sourcing to the groundwater.
5. Review historical records to assess locations, time periods or events of potential releases.

This investigation involved interviews with site personnel, review of files and other records, site visits, sampling of septic systems, and sampling of soils for multiple compounds.

### **3.2 SUBSURFACE CHARACTERIZATION**

A number of investigation methods were used to evaluate the impact to the subsurface systems at the site and to estimate the fate and transport of the compounds in the groundwater regime. These included: boring logs and Piezocones to define local geologic conditions; well and piezometer installations to monitor changes in water levels and water quality over time at a number of on-site and off-site locations; Hydrocone samples to assess off-site water quality without permanent wells; and permeability tests in all wells and most of the Hydrocones for use in fate and transport analyses.

#### **3.2.1 Soil Borings**

A total of ten soil borings and three Piezocones have been installed at the site. One soil boring (R17) was installed off-site in 1962 by the South Carolina State Development Board, Division of Geology in front of the Sandy Level Church (Figure 2). This boring has been included in this report because of its close proximity to the study site, and its quality log, making the total number of borings equal to eleven. Borings for MW-1, 2, and 3 were completed in 1983, MW-4 was completed in 1984, MW-5, 6, and 7 were completed in 1988, EDW-1, 2 and 3 on the adjacent property were completed in 1989, and the three Piezocones were completed in 1992. Borings for all monitoring wells (MWs and EDWs) were installed using standard hollow-stem auger techniques while collecting soil samples with split spoon devices, according to ASTM D-1586. Hammer blows and descriptions of the geologic materials penetrated are recorded on each of the boring logs in Appendix A.

The Piezocone borings used a modified Dutch Cone Penetrometer rig to investigate the subsurface units. The gauges in the tip of the device are able to sense the difference in frictional and point stresses, relate these stresses to the geologic materials, and generate a "synthetic" blow count and geologic description of the material penetrated. These Piezocone logs also are presented in Appendix A.

#### **3.2.2 Well Installation and Groundwater Sampling**

All ten monitoring wells are constructed of 2-inch diameter, schedule 40, flush-threaded PVC casings and screens, with lockable steel protective casings at the surface. The two Piezometer locations are constructed of either one-inch or two-inch PVC, and also have protective casings at the surface. Each installation has a sand pack surrounding the well screen, a bentonite seal

above the sand pack, and either native backfill (MW-1, 2, and 3) or grout (MW-4, 5, 6, 7, EDW-1, 2, 3, and PZ-1 and 2) extending from the bentonite seal to the surface. Table 1 is a summary of the well construction details for all of the installations for this investigation. The second Piezometer (PZ-2) was installed at the HC-12 location as a double completion, with a screen set at 27 feet and second screen set at 50 feet. Bentonite, in the form of Holeplug, was used to seal the boring between the two screens.

For this report the MW-prefix is used for monitoring wells, the EDW-prefix for the three off-site monitoring wells installed in 1989, the HC-prefix for Hydrocones, the PC-prefix for Piezocones, the PW-prefix for the two on-site production wells, and the PZ-prefix for piezometers. The use of the PMW-prefix for monitoring wells has been dropped because it was used to denote "proposed monitoring well" in various earlier work plan documents and was then inadvertently carried into the final reports for those field efforts.

Each of the monitoring wells was developed by air surging or pumping after it was completed. Table 1 contains a summary of key information regarding the locations, elevations and completion of the wells, Piezometers, and Hydrocone locations for this KLI investigation. Well MW-8, proposed to be installed west of the reactor pad and south of MW-2, was not installed, with the concurrence of DHEC staff, after reviewing the preliminary Hydrocone data in the field. Two piezometer installations (PZ-1 and PZ-2) were installed nearby, for additional water level data.

In the same fashion that the Piezocone was advanced, the Hydrocone was advanced into the subsurface using hydraulic pressure. Because the Hydrocone device could not penetrate the subsurface soils because of the degree of induration exhibited by the local Middendorf Formation, the Hydrocone borings were advanced by first pre-drilling each location with hollow-stem augers to a point just above the intended sampling point. The Hydrocone was then lowered to the bottom of the augers and advanced several feet into the undisturbed formation to collect the required sample. The Hydrocone locations were numbered sequentially (1 through 12) and the depth in feet to the bottom of the screen was added to that number to complete the sample ID. For instance, HC-3-33 is the sample collected from the third Hydrocone location with the Hydrocone screen open from 32 to 33 feet below grade.

The wells on site were sampled according to the protocol submitted in the work plan proposal. The analytical plan was devised to accomplish the quarterly sampling concurrently with the field work for the current investigation. Once the data were received from the laboratory, the

analyses were reviewed in a number of ways, including a comparison with pertinent regulatory levels. Table 2 contains a summary of those regulatory levels for groundwater compounds detected during this investigation. The raw analytical data for the latest round of analyses, which include the quarterly sampling results, are presented in Appendix B. All raw sampling results from previous sampling efforts have already been submitted to DHEC, and they will not be repeated herein.

### 3.2.3 Hydraulic Analyses

Two types of hydraulic tests were conducted during this field effort: slug tests in completed wells and rate-of-filling tests while collecting water samples with the Hydrocone. The slug tests were of both the rising head and falling head variety, using a weighted PVC tube to displace the water level. Water level response data were recorded with an In-Situ Hermit 1000C Datalogger and a 10 psi transducer, and were analyzed by the modified Bouwer-Rice method, as incorporated into a computerized spreadsheet program. The sensors in the Hydrocone allow the rate of filling of the sample chamber to be monitored very accurately. This data plot for most Hydrocone samples was analyzed to determine the undisturbed hydraulic conductivity of the formation surrounding the tool while collecting a sample.

### 3.2.4 Fate and Transport Analysis

In concert with the preceding studies, a preliminary fate and transport study was incorporated into this investigation. The fate of the contaminants is dependent on many factors, including the actual compounds in the groundwater (their densities, concentrations, solubilities and retardation factors), the directions and gradients of groundwater flow, the orientations, locations and relative permeabilities of the geologic materials present in the subsurface, and the occurrence of a biological population in the aquifer that is able to degrade the specific compounds in the subsurface.

To accomplish the preliminary fate and transport analysis of this site, the following steps were completed:

- Construct a number of potentiometric maps to identify principal flow directions and gradients in the water table aquifer.

- Construct hydrographs for each monitoring well, to identify patterns in water table responses and trends over time.
- Construct hydrogeologic sections, including appropriate geologic, water level, and hydraulic conductivity data, to prepare vertical flow nets to predict potential groundwater flow paths.
- Prepare first-order capture zone analysis to estimate the potential effectiveness of selected preliminary configurations of recovery wells.

### 3.3 RECEPTOR CHARACTERIZATION

Two principal potential receptors have been theorized for the study area: the local streams and seeps, with their indigenous natural populations; and the local private well owners currently using their wells for consumption. To address these concerns, two tasks were accomplished during this field effort: a survey of the streams and seeps to the north of the subject site, and an inventory of all wells within a quarter-mile radius. A total of four surface water samples were collected during this field effort, and both of the on-site production wells were sampled for monitoring well parameters.

## Section 4

### INVESTIGATION RESULTS

#### 4.1 SOURCE CHARACTERIZATION

##### 4.1.1 Site History and Process Overview

The operations at the KLI location began in 1970 as a one-man, lab-scale facility fabricating specialty chemicals. The first large-scale reactor vessel was installed in 1973. Growth continued through the 70s in both the size of the operation and the scope of the compounds produced.

During the 1970's, waste products were deposited into drums, and some of those drums were stored on-site, while others were taken to recycling and disposal facilities. The on-site storage areas included the area to the west of the wooden warehouse, and north of the reactor pad, in the vicinity of MW-2 (Figure 6), including areas now occupied by lab and storage facilities beside the production area.

A site visit by DHEC in 1980 resulted in the initiation of soil and groundwater contamination assessments by KLI. The soils were remediated in 1983, 1985 and 1986 to within DHEC guidelines. The stored waste products were shipped to Pinewood and ABCO for disposal and incineration, respectively. Changes were made in the plant operations to reduce waste volumes and prevent environmental releases. These changes included roofing the reactor pad to prevent contaminated rainfall runoff, and constructing a containment dike around the reactor pad and any other areas where chemicals were handled to contain spills, leaks and other miscellaneous releases.

Currently all wastes are managed and disposed of according to DHEC guidelines. Ignitable materials are sent to a fuels blending facility, where they are combined with other flammable materials and destroyed by combustion. Aqueous wastes are transported to New Jersey for disposal or recycling, and solid wastes are sent to one of several secure landfills for burial.

The principal products produced by KLI are brominated compounds, acid chlorides, and a wide variety of intermediate compounds necessary to the manufacture of pharmaceuticals, coatings, flavors and fragrances. Manufactured chemicals are used in: the manufacture of computer chips and high-precision printing plates; and the fabrication of monomers for special plastics. The sizes of product orders filled by KLI have ranged from one gram to several tons. Table 3 contains a list of compounds found on the Appendix IX list that have been used on site at the KLI facility during its 22 years.

Figure 6 is a site map that depicts the principal site activities and their locations on the KLI property.

Three potentially significant release events occurred since the 1982 ACO was entered into: a spill of 500 gallons of wastewater that occurred on November 6, 1988, a fire which destroyed the lab building on March 9, 1989, and a fire on July 21, 1991. The spill in 1988 was cleaned up by KLI personnel under DHEC oversight using absorbents for the free liquids and excavating the contaminated soils. The fire in 1991 is suspected to have been caused by arson. Neither fire resulted in any significant release to the site soils because all but minor quantities of the water used to fight the fire were captured in the containment dikes of the plant. Both fire cleanups were completed under DHEC direction, the first by KLI personnel and the second by Bryson Industrial Services. All waste products and debris were properly disposed of with DHEC approval.

#### 4.1.2 Soil Sampling Results

A total of eight soil samples were collected from among the twelve locations used during the November 27, 1990, sampling effort by DHEC. The locations to be sampled for this investigation are shown on Figure 6 and were selected based on the analytical results of the DHEC sampling event. Sample locations 02 and 03 were composited for this investigation because of their proximity to each other in the DHEC program.

Each sample in both investigations was analyzed for selected metals, volatile organic and semi-volatile organic compounds. In addition to these analytical methods, library searches were also conducted on the organic fractions of each analysis. Table 4 contains a summary of these analyses, and a summary of the library search results for both the DHEC and KLI investigations, and allows a direct comparison between them. The second page of the table also contains a list of naturally-occurring background concentration ranges for selected metals in southeastern soils.

The table documents that only one sample (SS-11) contains any metals above natural background (selenium at 4.6 mg/kg). This area is by the northern end of the office building, where there had been some recent landscaping activities. New concrete sidewalks had been poured and new topsoil brought in. The area had been heavily fertilized with cow manure during the summer. An effort was made in the field to get below the fill and to sample some of the less disturbed soil material below it. The selenium levels elsewhere on site are within the naturally occurring range and are always below the DHEC analysis for the same location.

No volatile or semi-volatile organics in the soil samples were confirmed at levels that could contribute to groundwater contamination. Sample 08 contained no detectable levels of bromoform, rather than the 43,000 ug/kg reported by DHEC.

The library search for the KLI soil samples is presented on Table 5 and is summarized on Table 4 beside the DHEC results summary. Two observations are readily made on the Table 4 comparisons: the CAL list of tentatively-identified compounds (TICs) is far shorter than the DHEC list, and there are no TICs in common between the two lists. The raw chromatograms used in the library searches for the eight KLI soil samples are provided in Appendix B and show only the peaks for the five internal standards and surrogates (RTs approx. 21.90, 22.28, 30.77, 40.71, and 41.38) with the much lower peaks of the TICs. There are a total of only six unknown compounds occurring in the eight analyses. The retention times (RT) for these six compounds are approximately 3.86, 3.95, 29.33, 39.90, 48.30, and 53.33. Even if these six compounds had been identified, that would bring the current TIC list to only ten, which is approximately one-third the number on the DHEC list. The chromatograms in Appendix B show no other peaks for additional library search identifications. The source of the extensive DHEC TIC lists is unknown.

#### 4.1.3 Septic Tank Assessment Results

There are two septic tanks on the KLI site (Figure 6). The first tank, located behind the office building, receives only sanitary waste from the office rest rooms and a sink. The second tank, located north of the eastern laboratory, receives sanitary waste from the lab rest room and handwash station. Neither tank was designed or built for the disposal of process wastes. However, the lab sink may have occasionally received small volumes of chemicals from normal lab operations.

A sample was collected from each tank on July 8, 1991 by DHEC and a second sample from each tank was also collected later by KLI personnel. Each sample was analyzed for priority pollutant organics and selected metals, inorganics and ions. A summary of the independent analyses of those samples is presented in Table 6. The analyses from the two laboratories are in reasonable agreement with two compounds higher in the DHEC sample (cadmium and lead) and two compounds higher in the CAL samples (methylene chloride and toluene). This is considered to be very good agreement, given that these two samples were collected by different personnel at different times and cannot be considered as split samples.

The office septic tank contained no compounds of interest in regard to its acting as a continuing source of contamination to the groundwater. The tank serving the lab contained levels of cadmium, lead, mercury, and methylene chloride above their respective regulatory levels. The levels of cadmium, lead and mercury are not of primary concern because these metals are generally not very mobile in the soil column or groundwater phase, and would not likely be present in even these low levels in the groundwater. While the levels of methylene chloride would be reduced by physical and biological processes, both within the tank, and while traversing the 25 feet of vadose zone between the tile field and water table, the concentration of methylene chloride in the septic tank may be sufficient to be acting as a source to the groundwater. This is because the compound is highly mobile and readily transported in the subsurface.

A request was made to the City of Columbia on November 20, 1992, to allow KLI to dispose of the contents of the lab septic tank at the City Wastewater Treatment Plant in an effort to remove a potential source of contaminants to the water table aquifer. The City responded on December 3, 1992, accepting the waste, and the septic tank waste was removed on December 11, 1992.

## 4.2 SUBSURFACE CHARACTERIZATION

### 4.2.1 Site Geology

The KLI site is underlain by approximately 40 feet of coastal plain deposits of sand, silt and clay. These deposits are a part of the Middendorf Formation and rest unconformably on the silty sandy clays of the Carolina Slate Belt soils. Only two borings (EDW-2 and HC-6) reached refusal on top of rock while drilling. No bedrock assessment has been attempted during the site investigation to date.

The Middendorf Formation at the KLI site is composed of a number of thin, discontinuous layers of sand, clay and silt, in various mixtures. There appears to be a clay layer near the surface in a number of the monitoring well locations. Only the boring log for MW-2 mentions a perched water table on top of it, so the clay is probably not a significant confining unit. As shown on the hydrogeologic sections (Figures 8, 9, and 10), the surficial units appear to drape over at the valley walls. This draping effect is consistent with the soils report that indicated there may be some downslope creep of the coastal plain deposits into the valleys, and that the coastal plain units may be covering parts of the Piedmont soils. The other units in the Middendorf are composed of semi-indurated sand and clayey sand that was tough to drill through. Colors ranged from white to red and purple. The base of the Middendorf contains a poorly-graded sand that rests directly on the Carolina Slate Belt soils. There appears to be no confining unit between the two formations.

The Carolina Slate Belt units have been deeply weathered in place, and those resulting weathered soils, called Saprolite, have been found to retain relict structures of the parent rock from which they were developed. The predominant lithology of the Saprolite is red to yellowish red clay, with various amounts of silt and sand. Where it has been identified, the top of the Saprolite unit appears to be consistently located between the elevations of 490 and 500 feet. Refusal on top of rock was encountered in two borings: EDW-2 (at elev. 482') and PC-6 (at elev. 484'). In each case, the boring was terminated where rock was encountered and the augers could not be advanced. The MW-5 boring did not encounter refusal at the same elevations as did the other two borings, and the boring from MW-5 was advanced 87 feet to the elevation of 440 feet, and encountered no bedrock, which may indicate that the top of the rock surface has a great deal of relief. It appears that MW-5 is a saprolite well, from the sections (Figures 8, 9, and 10).

The top surface of the Saprolite is shown on the figures as a straight, nearly horizontal line; however, the actual location of that line is probably highly irregular. The Hydrocone borings were advanced without sampling the soils and may be completed in zones other than shown on the figures because of this irregularity. For instance, HC-6 on Figure 9 was installed and sampled as if it were a Middendorf completion, but the section shows it to be inside the Saprolite zone. When the boring was deepened to collect a Saprolite sample, rock was encountered and the boring terminated. HC-11 was intended to be a double-completion also, with water samples collected from both the Middendorf and Saprolite, but yellow Saprolite materials were observed in the cuttings at the first sample depth, indicating that only a Saprolite sample was possible there.

#### **4.2.2 Site Hydrogeology**

The following discussion of the site hydrogeology includes an initial presentation of the results of the site-wide hydraulic testing program (both slug tests and Hydrocone rate-of-filling tests), followed by an assessment of groundwater levels, flow directions and gradients. These data will then be expanded in Section 4.2.5 in the fate and transport assessment.

##### **4.2.2.1 Hydraulic Analyses**

A total of 27 hydraulic tests have been completed on the KLI site and adjacent property, including six in the saprolite aquifer and twenty-one in the Middendorf aquifer. Table 7 summarizes the results of these analyses and shows that seventeen were accomplished as slug tests in monitoring wells, and ten were conducted with the Hydrocone. Instrumentation problems prevented tests in all Hydrocone locations, and slug tests could not be conducted in EDW-3 because the well casing had been bent over and constricted at a depth of several feet below grade, which prevented the insertion of the PVC slug into the well. Apparently, the well has been damaged by logging vehicles when the property was cleared. Water levels can be obtained, but the previous measuring point has been lost because the top of the inner (PVC) casing has been broken off. Only a slug-out test was conducted in EDW-1 because the water level was very close to the surface and the water flowed out of the well when the slug was installed. Once the water level had equilibrated over the course of several hours, a slug-out test was conducted, and the results are included in this report.

The hydraulic conductivity of the saprolite aquifer ranges from  $3.8 \times 10^{-3}$  ft/d (EDW-1) up to  $1.66 \times 10^{-2}$  ft/d (MW-5) with a mean of  $9.15 \times 10^{-2}$  ft/d. This is in the low range of hydraulic conductivities and is indicative of the high clay content of the unit. The Middendorf hydraulic conductivity values range from a low of  $6.40 \times 10^{-2}$  ft/d (HC-8) up to a maximum measured at 162 ft/d (MW-3). In calculating the mean hydraulic conductivity for the Middendorf aquifer at the site (1.71 ft/d), the values from MW-3 were discounted because they were so much higher than the others, and because MW-3 is the only tested well where the screen zone was intersected by the water table. The Bouwer-Rice analysis breaks down somewhat when part of the screen is unsaturated, and it was felt that its inclusion in the future analysis of the site hydraulics was not justified.

The values for the Hydrocone tests were produced by a sampling screen only one foot in length. This short screen may become partially blocked by a thin clay layer in the sampled zone in a

given test, resulting in a calculated conductivity that is lower than would be measured in a standard monitoring well with five or ten feet of screen.

#### 4.2.2.2 Water Level Analyses

Table 8 contains the measured water level elevations for the period of record for all wells on site. These data have been complied into a series of hydrographs (Figure 11) and potentiometric maps (Figure 12) to conduct an analysis of flow directions and gradients. The water levels on Figures 7, 8, 9, and 10 were also included in this assessment.

As can be seen on Figure 11, water levels show a great deal of variability over time. Variations of as much as five feet are observed in many of the wells. Several other relationships are also evident:

1. MW-2 initially exhibited the highest water table elevations of any well, as a probable result of groundwater mounding beneath the cooling water discharge ditch, prior to it being piped to the creek.
2. Otherwise, MW-1 or MW-4 usually have the highest water levels.
3. MW-6 always has a lower water level than both MW-2 and MW-4, indicating a continued potential for off-site groundwater flow.
4. MW-6 always exhibits a consistently higher water level than does MW-5, the adjacent saprolite installation, demonstrating the existence of a stable downward hydraulic gradient at that location. The calculated gradients between MW-6 and MW-5, using the mid-point of the screens for the calculation, ranges from .108 on 10/27/89 to .024 on 7/31/90 with a mean of 0.064 over the period of record. The head difference between the wells ranges from 1.0 to 4.6 feet, over the 42.5-foot distance between the well screen centers. (During the field work for this investigation, it became apparent that the survey data for well pair MW-5 and MW-6 had become mis-identified in previous reports, even though the well covers in the field retained their correct well numbers. As a result, even though historical sampling results are attributed to the correct wells, all water level data were reversed. The data in Table 8 and Figure 11 contain the corrected data, which supersedes all data in previous reports.)

A number of water-table maps were constructed during this investigation, but only two are presented in this report. The water level data from 9/2/88 and 8/15/91 were selected because the measurements for those dates appear to mark reasonable periods of high and low water table conditions (Figure 12). These conditions were selected to present the stability of flow directions and gradients over time at the site. These same water level measurements are also shown in section view on Figures 8, 9, and 10.

As shown on the potentiometric maps (Figure 12), the flow in the Middendorf Aquifer is consistently to the northeast. The principal discharge location for the groundwater flow is along the streambeds below the Church Spring, and the spring at SW-2, to the north of MW-6. Water levels in the wells adjacent to the northern spring (EDW-2) and the stream confluence by SW-3 (EDW-1) are both above the stream level, indicating an upward potential that is consistent with a discharge zone. The measured heads in the wells above the adjacent surface water bodies for the two measurements of record are:

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**Height of Groundwater Levels (ft) Above Adjacent Stream Beds**

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<u>Date</u>	<u>EDW-1</u>	<u>EDW-2</u>
10/23/92	2.73	2.99
11/30/92	4.08	3.77

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In reviewing the potentiometric maps for the site, including Figure 12, it appeared that lines drawn between MW-2 and MW-6 and between MW-1 and MW-7 were fairly reasonable approximations of flow lines. These well pairs were used to estimate hydraulic gradients across the KLI property.

Between MW-1 and MW-7, the range of hydraulic gradients was from 0.0017 to 0.0033, with a mean of 0.0026. This is very tight range, exhibiting a high value of only twice the low value. On the other hand, the gradient from MW-2 to MW-6 exhibits a ten-fold range (0.0012 to 0.012) with a mean of 0.0053. The summary presented below displays the gradient data in a fashion to facilitate comparisons.

## RANGE OF HYDRAULIC GRADIENTS

Range	Well Pairs		
	MW-1/7	MW-2/6	MW-6/5
High	0.0033	0.012	0.108
Mean	0.0026	0.0053	0.064
Low	0.0017	0.0012	0.024

The low values of gradients at the MW-2/6 and MW-1/7 well pairs are almost identical, but the MW-2/6 pair exhibits a wider fluctuation than the MW-1/7 well pair, probably resulting from the MW-6 location lying on the edge of the ridge, just before the drop-off to the local stream discharge point. This location would experience wider water-level fluctuations, because of its proximity to the discharge point, and therefore produce more variable gradients.

Figures 7, 8, 9 and 10 depict the rapidly-steepening gradient just beyond the line from MW-3, MW-7, and MW-6, at the edge of the ridgeline. This steeper gradient was not measured between on-site wells, but it would be on the order of 0.043 based on a 15-foot head drop along the 350-foot distance from MW-6 to SW-1.

The gradient between the Saprolite and Middendorf Aquifers, as measured at the MW-6/5 well pair, ranges from 9 to 20 times the gradient measured between MW-2 and MW-6. This indicates that there is a strong downward potential at this part of the property. However, in almost all aquifers, the horizontal hydraulic conductivity is significantly greater than the vertical, often exceeding several orders of magnitude. A nominal range of 10 to 100 is not unusual, and a value of 10 is often selected as a conservative number, when no other data are available.

### 4.2.3 Groundwater Quality Analyses

In the sections that follow, the groundwater quality will be discussed in the order of general and inorganic compounds first, followed by the organic compound analyses. This was done for clarity and simplicity because of the volume of data to analyze.

#### 4.2.3.1 General and Inorganic Analyses

The general and inorganic analyses for all monitoring wells at the KLI property are presented in Table 9. The following observations were made while reviewing the data presented on that table:

1. Metals analyses exceed regulatory levels only infrequently, with iron being the most common violator; and other violations occurring for lead, mercury, selenium, chromium and cyanide. Following the violations by metals there are usually numerous analyses with levels that are either non-detectable or below the regulatory limit. The only wells showing metals elevated above the regulatory levels on the latest sampling event were MW-2 and MW-3 which showed slightly elevated levels of mercury and selenium (MW-2), and mercury (MW-3).
2. Barium was detected in all wells, including the background well, MW-1, where it was detected at 0.5 mg/l.
3. The background well, MW-1, showed levels of TOC up to 28.1 mg/l (with a mean of 3.5 mg/l) and levels of specific conductance ranging from approximately 20 to 30 umhos/cm<sup>3</sup>.
4. There appears to be a rough parallel between the TOC and TDS analyses for wells MW-2, MW-4, MW-6 and MW-7, the most contaminated wells on site.

From these observations, it is apparent that metals are encountered only intermittently in any well, with no apparent pattern, which indicates that metallic contamination, if present in the groundwater, is of extremely minor consequence. The parallelism between TDS and TOC in the monitoring wells confirms that these parameters may be good indicator analyses for groundwater contamination at this site.

#### 4.2.3.2 Organic Analyses

A summary of the organic analyses performed on groundwater samples to date is presented on Table 10. In reviewing this table it becomes evident that, qualitatively, the eight principal contaminants in the groundwater are: benzene, chloroform, 1,2-dichlorobenzene, methylene chloride, toluene, trichloroethene, pentachlorophenol and phenol. These compounds, as well

as other detected organics, have been arranged on Table 11 in order of their relative mobility in a groundwater environment. The site-related compounds range from the miscible and mobile (acetone) to the relatively insoluble and refractory (pentachlorophenol and naphthalene). Figures 13, 14, 15, 16 and 17 are maps depicting the plume configurations for a number of these compounds for the dates November 1988 and October 1992.

Ten plume maps have been constructed, showing the distribution of five compounds at two time periods. To display the distribution of contaminants in the subsurface, four organic compounds were selected for mapping: benzene (Figure 13), chloroform (Figure 14), methylene chloride (Figure 15), and trichloroethene (Figure 16) for the two dates 11/22/88 and 10/26/92. TDS (Figure 17) was also selected because it also is a good marker for the plume location. Apparently, the organic compounds were released in the past as part of a high-TDS wastewater. The two maps on each figure have two differences between them - the four-year time between maps, and the additional data points available for the latest map.

The maps on Figure 13, document that the current benzene plume originates near HC-1, and reaches a current maximum near the MW-6 location. The main part of the plume appears to stretch out from MW-6 toward SW-1, through the HC-6 location, and bend almost due east. It appears that the plume maximum has moved during the period of 1988 to 1992 from a location near MW-4 to its current location near MW-6.

As shown on Tables 10 and 11, benzene concentrations are decreasing over time. Benzene is a highly mobile and biodegradable compound, and the decreases noted may be the result of the action of both mechanisms.

Plume maps constructed for the same two time periods for the other four compounds show similar patterns: East-northeast flow direction, and a shift in plume center toward MW-6 and HC-6. The map for trichloroethene also shows a shift to the south-southwest, toward MW-1, but this is merely the result of the 1992 Hydrocone sampling in that area where no sampling had been historically conducted.

In reviewing pages 4 and 5 of Table 10 where laboratory GC/MS data are compared to the Hydrocone field GC data, all analyses compare favorably, except the analysis from HC-6-23. The field GC reported 818 mg/l of benzene (vs. 367 ug/l for the lab result) and non-detects for chloroform and methylene chloride (vs. 798 ug/l and 127 ug/l, respectively, for the lab results). It appears that these three early-eluting compounds may have been summed by the field GC and

reported as benzene. Figures 13, 14, 15 and 16 used the lab data to generate the plume maps, rather than the field GC data.

Table 11 presents a mobility-ranked table for most site organic contaminants. Attached to this table is a trend analysis for those compounds with sufficient analyses, indicating that the concentrations of most compounds are declining in most wells, while a few are increasing. All compounds are declining in MW-2 and MW-4, but methylene chloride, trichloroethene, and 1,1,1-trichloroethane concentrations are rising in MW-5, MW-6 and MW-7, as shown on the table. This confirms that the plumes are mobile, are moving from the MW-2 and MW-4 area to the MW-6 area. The trend in MW-5 indicates that some contaminants are continuing to migrate into the lower aquifer.

A library search was completed on the organic fractions for samples collected from MW-2 and MW-4. This was done in order to assess the potential for any other organic compounds not on the standard analytical list to be present in the groundwater. No compounds were found in the MW-4 sample, but six were found in the sample from MW-2:

- 2-ethyl hexanal
- Methylthiobenzene
- 2 Unknowns
- 2 Unknown hydrocarbons

#### 4.2.4 Surface Water Quality Analyses

A number of water samples have been collected from the local surface water bodies for chemical analysis. The samples have been analyzed for general parameters, selected metals, volatile organic compounds, and semi-volatile compounds as summarized in Table 12. A wide range of sampling numbers have been used to label the surface water samples in the past. Table 12 has grouped those samples thought to come from the same location, and put them into chronological order. Even the samples coming from the same vicinity, such as the northern seep near SW-2 may not have been sampled consistently at the same location because of the dense vegetation there, and the large boggy area that the spring occupies. For this investigation surface water sampling locations have been marked with PVC or wooden stakes carrying the sample ID, flagged with surveyors ribbon, and surveyed for northing, easting and elevation, to facilitate recovery of the same locations for subsequent sampling events, as needed.

The most common metals detected in the surface water were chromium, lead and mercury, which were detected intermittently during the project history. Chromium was detected more consistently (at levels up to 0.58 mg/l) in samples prior to 1985, and only once (at 0.02 mg/l) since then. Mercury has not been detected in the northern seep (near SW-2) since 1985, as well. Lead appears as often as the other two metals discussed above, but the occurrence is more sporadic, with no discernable trend.

Organic compounds have been detected in all surface water sampling locations except SW-3. The spring at SW-2, near EDW-2, has been the most sampled and most consistently impacted location. However, downstream samples (SW-3) show no impact, indicating that evaporation, or biodegradation are active in the stream to reduce the levels below detectable amounts. The Church Spring showed low-level impacts by chloroform and trichloroethene in November 1988, but no impact was found in a September 1991 follow-up analysis by DHEC. In February 1992, a DHEC analysis showed a low level of 1,2-dichlorobenzene in the stream to the northwest of the site, near the confluence where Center Creek is formed. However, a sample from that same location for this field effort did not confirm that analysis.

#### 4.2.5 Fate and Transport Analysis

This section discusses the fate and transport of the contaminants within the groundwater system. Included in this section are a discussion of the groundwater velocities, semi-analytical groundwater flow model, and a description of the modeled scenarios.

##### 4.2.5.1 Groundwater Velocities

Groundwater velocities were calculated for the three zones within the Middendorf Aquifer (based on different local gradients) and a single zone for the Saprolite Aquifer. The following equation was used to calculate the groundwater velocities of the different zones:

$$v = \frac{KI}{n_e}$$

The gradient of the Middendorf aquifer varied from 0.0026 to 0.043, as discussed in Section 4.2.2. The average flow path for the Saprolite Aquifer was estimated from a flownet analysis and was used to estimate the hydraulic gradient of the Saprolite aquifer. The hydraulic gradient was determined to be 0.02. Mean hydraulic conductivity values, as determined by slug tests

performed at the site for the two aquifers, were used in the calculations (Table 7). The effective porosities for the Middendorf and Saprolite aquifers were 0.20 and 0.35, respectively, as determined from the literature (Walton, 1991). After determining the three input parameters for each aquifer, the rate of flow for each aquifer was calculated. The groundwater velocity in the three zones of the Middendorf aquifer were 0.022 ft/day (8.1 ft/year), 0.045 ft/day (16.5 ft/year), and 0.37 ft/day (130 ft/year), and the groundwater velocity in the Saprolite aquifer was 0.0052 ft/day (1.9 ft/year).

#### 4.2.5.2 Flow Model

The semi-analytical groundwater flow model RESSQC was used to delineate capture zones with the use of a single or multiple pumping well system. RESSQC is distributed by the International Ground Water Monitoring Center. The model assumed a homogeneous aquifer that exhibited two-dimensional, steady-state groundwater flow in an areal plane.

Single or multiple pumping wells can be modeled to delineate potential capture zones. The flow model requires input of various aquifer parameters, such as transmissivity, saturated thickness, hydraulic gradient, porosity and flow direction.

#### 4.2.5.3 Modeled Scenarios

RESSQC was used to model several scenarios to determine the potential alternatives for the placement of pumping wells to capture the plume. The scenarios included wells placed on-site only and wells placed both on and off-site. The model was run for wells placed only on-site to delineate the capture zone with the use of on-site wells pending the permission of off-site access to install pumping wells. If off-site access is not granted only on-site pumping wells can be used. The modeling was performed separately for pumping wells screened over the Middendorf and Saprolite aquifers to determine capture zones in each aquifer.

Before running the model, an estimated flow rate was determined for each aquifer, to avoid over-pumping the modeled extraction wells. The plume width of 400 feet and the saturated thickness of the aquifer was used to estimate the plume cross section. The flow rates calculated above (Section 4.2.5.1) were multiplied by the cross-sectioned area to approximate the flow rate (in  $\text{ft}^3/\text{day}$ ) passing through the plume and requiring capture. The estimated pumping rates were determined to be 0.67 gpm for the Middendorf Aquifer and 2.0 gpm for the Saprolite Aquifer (assuming the groundwater plume in the Saprolite is the same size as that in the Middendorf).

If multiple pumping wells were used in a given scenario, the estimated pumping rate was distributed among those wells to avoid overpumping the aquifer.

Table 13 includes the input parameters for the 16 scenarios used to model the groundwater flow at the site. The placement of the wells and pumping rate, along with the aquifer parameters, determined the delineation of the capture zones. The capture zones were delineated for 3, 6, 9, 12 and 15 years of pumping for each scenario. Representative scenarios from the 16 that were run were chosen for the purpose of discussion in this section. Two well options were chosen to be discussed. The first option included one pumping well placed on-site. The RESSQC model was run twice, once for the Middendorf aquifer, and once for the Saprolite aquifer. The second well option included a total of three pumping wells, two placed on-site and one placed off-site. This option was also modeled for both the Middendorf and Saprolite aquifers.

The very low pumping rates modeled for the extraction systems are the result of the low hydraulic gradient, low hydraulic conductivity, and thin saturated thickness of the formation at the site. The low pumping rates present problems in the operations and maintenance of a proposed extraction well system, because those rates are difficult to maintain in the field. In order to accommodate the low hydraulic capacities of the local aquifers, one additional scenario was added, where the extraction wells in the Middendorf were replaced by a horizontal drain, both on and off the site. This was modeled as a linear arrangement of wells down the center of the plume to simulate a continuous drain.

The modeling resulted in plan view plots of the capture zones delineated for periods of 3, 6, 9, 12, and 15 years of pumping. The capture zones differed for each scenario and aquifer. Table 14 presents a summary of the results for all scenarios modeled. Plates 2A, 2B, 2C and 2D illustrate the capture zones of the two previously described scenarios for both the Middendorf and Saprolite aquifers. The plates can be overlayed on the plume maps (Figures 13 through 17) to observe the degree of plume captured by each scenario. One on-site well will not capture the plume within 15 years in either the Middendorf or the Saprolite aquifers (Plates 2A and 2B). Three pumping wells placed on and off-site in the Middendorf aquifer capture the majority of the plume. However, stagnation points occur between the wells (Plate 2C). Wells placed at the same locations in the Saprolite aquifer capture the heart of the plume but also have stagnation points between the wells (Plate 2D). Capture of the plume is affected by a drain along the centerline of the plume (Plate 2E), without stagnation points and without maintaining the low-rate well pumps.

## 4.3 POTENTIAL RECEPTOR CHARACTERIZATION

### 4.3.1 Stream Assessment

Two types of characterizations were accomplished in the stream: a conductivity survey to assess groundwater plume discharge locations, and an evaluation to assess the potential risk to human populations exposed to the surface water in the off-site stream.

#### 4.3.1.1 Stream Survey Results

On October 22, 1992 a stream survey assessment was completed. The activities undertaken included measuring temperature and specific conductance at eighteen key locations, and collecting a sample from SW-7, which closely matches sample location number 2 collected by DHEC on February 10, 1992. The conductivity meter was calibrated in the field, to maintain data integrity.

The map on Plate 1 depicts the locations sampled or monitored by both the February (DHEC) and October (KLI) sampling events. The DHEC sampling locations were estimated from descriptions provided by the February 14, 1992 memo from Bobby Bates. Table 15 presents the raw data and sampling locations descriptions from the October sampling event. Locations SW-1 through SW-9 were marked in the field with survey flagging and wooden or PVC stakes to facilitate recovery, if additional sampling is required. Locations SW-1, SW-2, SW-3 and the Church Spring have been surveyed for northing, easting and elevation, for current detailed mapping purposes.

The stream data indicate that background conductivity readings range from 20 to 40 umhos/cm<sup>3</sup>. Elevated conductivities were found in the run issuing from below the Church Spring and in the run issuing from the spring at SW-2, even though the Church Spring, itself, has consistently shown limited to no impacted water quality. Readings below the Church Spring started at 80 umhos at the head seep, rose to a maximum of 170 umhos at the overturned tree near the property line, and declined to 120 umhos at SW-1. Readings of 120 umhos persisted from SW-1 and SW-2, through SW-3, and declined slightly to 115 umhos at SW-5. At SW-6, the conductivity had dropped to 50 umhos, which probably represents the result of dilution by the flow entering from the eastern tributary run.

The western tributary receives cooling water discharge from KLI just below the dam for the eastern pond. The conductance and temperature both showed an increase at the outfall, but both measurements returned to background levels within a short reach of the stream. The conductance and temperature remained stable through SW-7, at the confluence of the two runs, where they form Center Creek. Because no other location was identified where the specific conductance was elevated in the western tributary, a water sample was collected from SW-7, to approximate the sample collected by DHEC in February. This sample was analyzed for VOCs, acid extractables, selected metals and cyanide. Table 12 contains these results, and indicated that there is no impact to the western tributary to Center Creek.

Only one new seep or spring (SW-8) was identified during this survey. No other sources of surface water were encountered during the visit, and no evidence of dry runs, which could contribute water during wetter periods, was noted. The conductivity and temperature at SW-8 were within background levels and indicated no impact from the KLI operations.

#### 4.3.1.2 Surface Water Current Use Risk Characterization

##### Characterization of Exposure Setting

The nearest off-site surface water in the vicinity of the King's Laboratory site is a pair of unnamed ephemeral tributaries to Center Creek. Center Creek is a tributary to Cedar Creek which is designated as a freshwater of the state. Freshwaters are suitable for primary contact recreation and as a source of drinking water after conventional treatment.

Cedar Creek is not currently utilized as a public source of drinking water. Exposure to chemicals of concern in the off-site surface waters may take place via recreational primary contact. The potential exists for dermal contact and incidental ingestion exposure from direct contact with chemicals of concern in the surface water, assuming a recreational access to the off-site tributaries.

##### Potential Chemicals of Concern

Sampling has been conducted to identify inorganic, volatile organic, and semivolatile organic compounds in the off-site surface water. The results of this sampling were used to identify the presence of chemicals of concern in the surface water. For the purpose of this risk screening, the following indicator chemicals were selected for quantification of risk:

- Benzene - indicator of mono-aromatic hydrocarbon compounds.
- Trichloroethene - indicator of chlorinated hydrocarbon compounds.
- Di-N-Butylphthalate - indicator of phthalates.
- Chromium and Mercury - indicator of inorganic compounds.
- Dichlorobenzene, 1,2 - indicator of chlorinated benzene compounds.

Lead could have been considered a potential chemical of concern, but it was not carried through this quantitative risk screening because lead does not have an EPA-verified slope factor or RFD.

#### Identification of Exposure Pathways

Only complete surface water exposure pathways were considered for the purpose of determining risks and for developing target concentrations. To be complete, an exposure pathway must have four components:

- A source of chemicals;
- An environmental transport medium;
- An exposure point for humans or non-human receptors; and
- A likely exposure route.

If any one of these components is not present, the exposure pathway is incomplete and would not contribute to exposure from the site.

Analysis of surface water exposure pathways was based on chemical data, information on current land use and populations, and information collected during the site reconnaissance. After assessing potential release mechanisms and receiving media under current land usage, the only potential routes of exposure to be addressed was the exposure of the public (child) through dermal absorption and incidental ingestion of off-site surface water.

#### Quantification of Exposure

Once the population and exposure pathway had been selected for quantitative evaluation, the next step in the exposure assessment process was to quantify the magnitude, frequency, and duration of exposure. This step is most often conducted in two stages: first, exposure concentrations are estimated; then, pathway-specific intakes are quantified. The specific methodology for

calculating exposure concentrations and pathway-specific intakes used in this assessment are discussed below.

#### Exposure Concentrations

Risk assessment should be based on an estimate of reasonable maximum exposure expected to occur under current conditions. During this screening assessment, exposure concentrations were derived in a conservative manner utilizing only the highest detected concentration of a chemical of concern for the exposure concentration to be used in the risk characterization. Table 16 summarizes the exposure concentrations in the off-site surface water used in this modeling effort.

#### Estimation of Chemical Intake

A general equation for estimating intake is shown in Table 17. Exposure estimates (intakes) are expressed in terms of mass of substance in contact with the body per unit body weight per unit time (e.g., mg/kg-day). Carcinogenic and non-carcinogenic chemical-specific intakes have been calculated for current land usage. Each exposure point concentration was converted to chronic daily intake (CDI). All intakes derived for King's Laboratory exposure screening assessment were based on chronic exposure. The results, summarized in Table 18 were used with reference toxicity values to evaluate the risk to human health associated with the exposure levels calculated in this section.

A child was selected as the receptor for surface water exposures, as the most reasonable and most conservative estimate of exposure (i.e., greatest exposure/intake potential) for ingesting of and dermal contact with chemicals of concern in surface water. For the ingestion route, the following variable values were used: ingestion rate - 0.05 liters/day (EPA, 1989a); exposure frequency - 3 days/week or 156 days/year; exposure duration - 7 years; body weight 21.5 kg; and averaging time - 2,555 days for non-carcinogens or 25,550 days for carcinogens. For the dermal route, the following variables were used; age-specific skin surface area (child - hands, arms, legs) - 4,000 cm<sup>2</sup> (EPA 1989a); permeability constant - 0.00084 cm/hour, based on default permeability constant for water (EPA, 1989a); exposure time - 1 hour/day, based on judgement; exposure frequency - 3 events/week on 156 events/year; exposure duration - 7 years, based on age span for skin surface area values used; body weight - 21.5 kg (average of age specific group; EPA, 1989b); and averaging time - 2,555 days for non-carcinogens or 25,550 days for carcinogens.

### Reference Toxicological Values

The indicative chemicals of concern (Table 16) were profiled using IRIS (11/25/91) and Health Effects Assessment Summary Tables (HEAST) (FY1991): Toxicity values for potential non-carcinogenic effects (RFD) and carcinogenic effects (slope factor) are integrated with exposure assessments to characterize potential risks to human health in the following section.

### Risk Characterization

Possible human intake, by substance and pathway, has been estimated in order to predict the potential human health hazards posed by existing chemicals of concern in the ephemeral tributaries adjacent to the King's Laboratory site.

Using the exposure pathways and estimated CDI's discussed previously and EPA approved toxicity values estimates for cancer risk and chronic hazard index were developed. The cancer risk estimates and chronic hazard index estimates are presented in Tables 19 and 20, respectively.

The total exposure risk for carcinogens is  $5.13 \times 10^{-8}$ . This total exposure risk does not exceed the National Contingency Plan (NCP) remediation goal range of  $10^4$  to  $10^{-6}$ . The total non-cancer hazard index is  $1.26 \times 10^{-1}$  which does not exceed the NCP goal of 1 (unity). These estimates indicate that currently no unacceptable human health risks are associated with the ephemeral tributaries.

#### 4.3.1.3 Surface Water Environmental Risk Characterization

The off site surface water tributaries adjacent to the King's Laboratory site discharge to freshwater of the state and therefore are considered suitable for the survival and propagation of a balanced indigenous population of aquatic fauna and flora. None of the volatile or semivolatile organic compounds detected in the surface water were measured at concentrations which exceed freshwater ambient water quality criteria values and are not expected to result in an unacceptable impact on the aquatic communities present.

Over the course of this study several inorganic constituents were intermittently detected at concentrations greater than their respective freshwater ambient water quality criteria. Chromium (chronic), Cyanide (acute and chronic), lead (acute and chronic), Mercury (acute and chronic),

Selenium (chronic), and silver (acute) exceeded their respective freshwater acute and/or chronic ambient water quality criteria once during the study. The presence of these inorganic constituents at levels above their criteria values suggests the potential for some in-stream impact. Two factors to consider when evaluating the reported instream concentrations of these metals are:

1. They are reported as total metals concentration and it is the acid-soluble or biologically available fraction of the total metal concentration that will be of toxicological significance to the aquatic community. It is likely that the aquatic community is being exposed to metals concentrations less than those predicted by the analysis of total metals.
2. The violations of water quality criteria are historical, occurring mostly prior to the end of 1985, and current levels do not violate those criteria.

#### 4.3.2 Local Well Inventory

An inventory of local water supply wells was conducted for the area surrounding KLI to a radius of a quarter-mile. The inventory was conducted by visiting the sites, marking well locations on a USGS topographic map, and interviewing well owners and well drillers to obtain available information.

There are a total of eight wells within the search radius, as shown on Plate 1 and Table 21. The data for these wells was difficult to obtain because of the age of the wells, the poor records kept by the owners, and the fact that some of the drillers have gone out of business.

All of the wells are at least cross-gradient from the KLI property; the Swygert well is upgradient; and the Holler well is upgradient and across the ponded stream from the KLI property. The two most frequently used off-site wells (Swygert and Holler) occupy the farthest away and most upgradient locations, and probably possess the least potential for being impacted by KLI operations based on location alone. The Masonic Lodge and Community Center wells are farther away from KLI than is the Church Well, and a water sample collected from the Church Well by DHEC on September 13, 1991 showed no evidence of impact by KLI activities.

The analyses from the two on-site production wells and the well on the adjacent Church property indicate that there is no impact to the bedrock aquifer from on-site activities. Based on these observations, there is no completed exposure pathway for the current use groundwater scenario, and therefore that pathway was not modeled for risk.

## Section 5

### SUMMARY AND CONCLUSIONS

#### 5.1 SUMMARY

##### 5.1.1 Project Location and Setting

- Site is located in Richland County, 1 mile west of Blythewood on S.C. Highway 59.
- It is located on the Fall Line, between the Coastal Plain and Piedmont Physiographic Provinces.
- The site is underlain by approximately 40 feet of sandy coastal plain deposits of the Middendorf Formation, and by approximately 50 feet of clayey residual soil, called saprolite. The fractured bedrock was encountered in only two borings and was not investigated during this phase of work.

##### 5.1.2 Project History

- Operations at the KLI site began in 1970 as a one-man, lab-scale enterprise.
- Principal products are brominated compounds, acid chlorides and other liquids used in the manufacture of pharmaceuticals, coatings, flavors, fragrances, computer chips, and special plastics.
- Waste management practices and housekeeping activities during the 70's resulted in the release of both organic and inorganic compounds to the soil and groundwater.
- Soil remediation was accomplished in 1983, 1985, and 1986 to satisfy DHEC cleanup goals.

- Groundwater assessment work has proceeded in a number of phases during 1983, 1988, 1989, and 1992.
- A spill of 500 gallons of wastewater in 1988 was cleaned up under DHEC supervision.
- Two fires at the facility (1989 and 1991) were extinguished without significant environmental releases, by capturing the runoff water inside the containment dikes around the chemical operations area.
- Currently, all wastes are disposed of or destroyed off-site, by permitted waste facilities.

### 5.1.3 Current Investigation Activities

- Twelve Hydrocone borings were installed both on and off site to collect groundwater samples without wells.
- Soil, groundwater and surface water samples were collected and analyzed to evaluate current extent of environmental impact.
- Local wells were inventoried.
- All wells were slug-tested to measure hydraulic conductivity of formations.
- A new base map was prepared for the site.
- Preliminary fate and transport analysis of contaminated groundwater plumes was conducted.
- A survey of local surface water streams was conducted to assess the impact of groundwater discharge to the water quality and to evaluate risks to potential receptors.

## 5.2 CONCLUSIONS

### 5.2.1 Contamination Source Characterization

- Sources of contamination to the groundwater include: contaminated soils resulting from waste management activities and housekeeping practices prior to 1980, and, possibly, discharges from septic tanks. Contaminated soils have been removed, and the septic tank has been cleaned out and the wastewater and sludge taken to the City of Columbia WWTP.

### 5.2.2 Subsurface Characterization

- Groundwater beneath the site currently shows the presence a number of organic compounds. These compounds include methylene chloride, phenol, chloroform, benzene, trichloroethene, toluene, 1,2-dichlorobenzene, and pentachlorophenol.
- The presence of metals and cyanide contamination are not a principal concern: cyanide, chromium, lead and mercury have been detected only intermittently in the past, and most often in the period before 1985. Only mercury and selenium were found to be above regulatory levels in only 2 wells during the last sampling effort, in MW-2 and MW-3. Barium was found in almost all wells on site, including the background well, MW-1. The barium levels ranged from 0.1 to 0.5 mg/l and indicate that it is naturally occurring and not related to site operations.
- The groundwater plume is moving to the northeast toward the stream, and not toward the northwest. The points of discharge for the groundwater are the springs and streambeds to the northeast of the site. The sample from Hydrocone 11 across the stream contained only carbon tetrachloride (which has been found in on-site wells only during this latest effort) and no other site-related compounds, which supports the conclusion that the stream is receiving the groundwater discharge.
- The results of this investigation indicate that the groundwater plume measures approximately 400 feet wide by 800 feet long in plan view.

- The TDS content of the groundwater appears to be an excellent predictor of the organic plume location. The organic contaminants have probably been released in the past as part of a high TDS wastewater. That TDS value is now serving to mark the plume location very effectively.
- The saprolite aquifer, beneath the Middendorf, has been impacted by organic compounds.
- The low hydraulic conductivity and saturated thickness of the aquifers beneath the site will allow only very low pumping rates for a groundwater recovery system. This serves to limit the feasibility of a pump-and-treat system and causes other remedial alternatives to be more attractive, such as drains and in-situ bioremediation.

#### 5.2.3 Receptor Characterization

- The two receptors identified during this investigation were off-site streams, and the nearby properties using bedrock wells for drinking water supplies.
- Calculated risks for the human receptors in the stream were within EPA guidelines. The environmental risk in the surface water derives primarily from metals analyses in samples collected prior to 1985. The current sampling round found no compounds above the water quality criteria. No impact was noted in the stream to the northwest.
- The local groundwater users are cross-gradient to upgradient of the study area, and the two on-site rock wells have been sampled multiple times with no impact noted. The well for the Sandy Level Church has been sampled once and no impact was found.

#### 5.3 RECOMMENDATIONS

- Postpone assessment of the bedrock aquifer until the saprolite aquifer can be more fully assessed. Saprolite assessment work should include multiple-depth well completions, possibly adjacent to existing wells in the Middendorf aquifer. Potential locations would be in the vicinity of MW-4, MW-5 and HC-6. A

permanent well or well pair at the HC-11 location would be beneficial to mark the downgradient extent of the plume, beyond the stream.

Borings should be advanced by mud-rotary techniques to assess the depth to bedrock, and decisions on well placement should be made in the field to maximize the data developed from the field effort. A third piezometer, near PZ-2, should be constructed to approximately 90 ft. depth to facilitate flow-net construction.

- Pursue a focused feasibility study to develop a remedial program for the site groundwater. Options to be included should be:

1. Groundwater Extraction Options

- a. Extraction wells
  - Middendorf Aquifer only
  - Saprolite Aquifer only
  - Both aquifers
- b. Drain with sump
  - Middendorf Aquifer only
- c. None

2. Groundwater Treatment Options

- a. Air stripping tower
- b. Aeration tanks
- c. Biological
  - in-situ
  - above grade
- d. None (utilize mixing zone)

3. Groundwater Disposal Options

- a. Modify NPDES permit
- b. Infiltration gallery
- c. Spray irrigation

- Initiate identified remedial actions on KLI property concurrent with further groundwater assessment.
- Initiate the following analytical program:

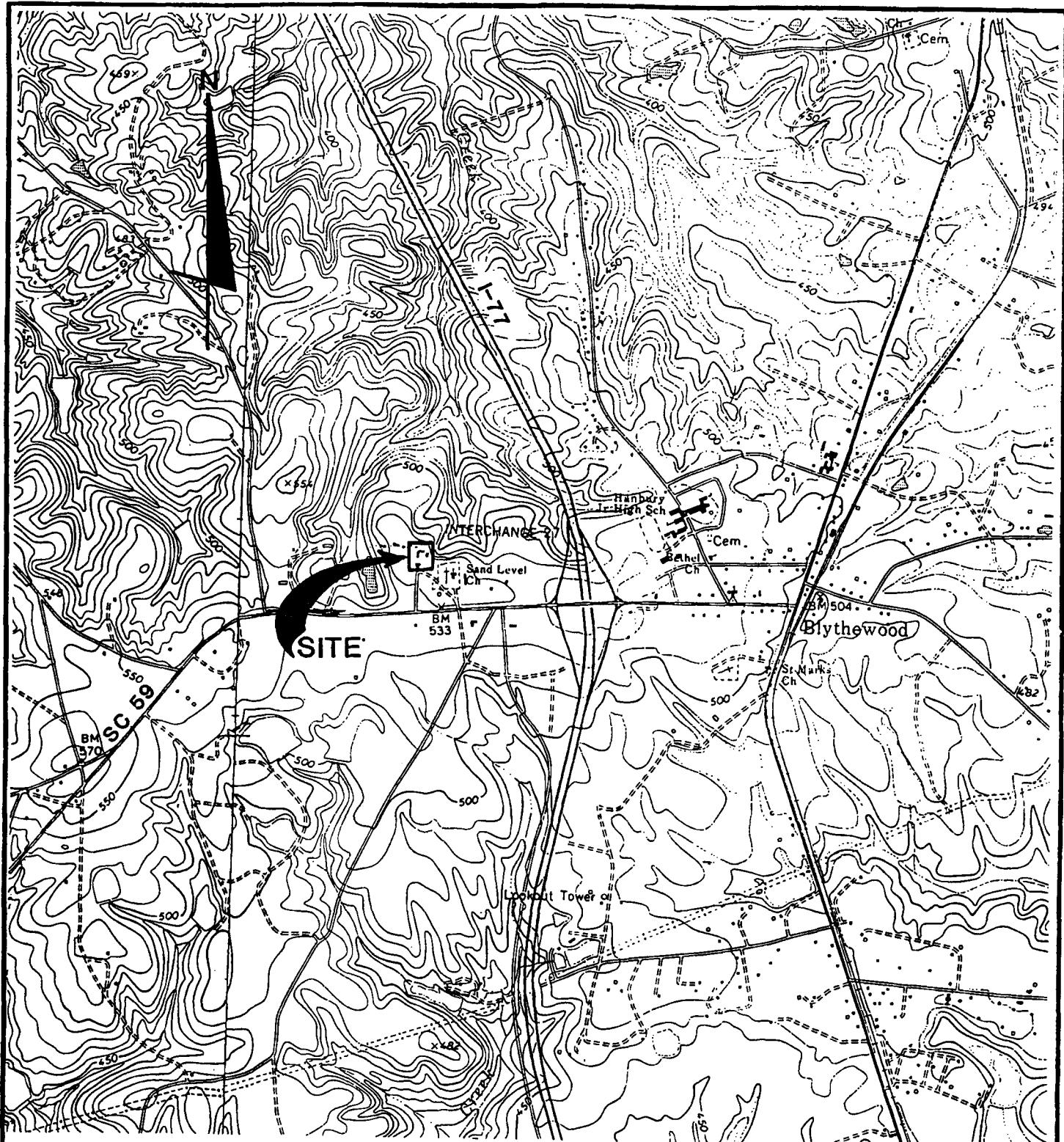
Analyte	<u>Groundwater<sup>1</sup></u>		<u>Surface Water<sup>2</sup></u>	
	Quarterly	Annually	Quarterly	Annually
Temperature <sup>3</sup>	X	X	X	X
pH <sup>3</sup>	X	X	X	X
Water Level <sup>3</sup>	X	X		
Specific Conductance <sup>3</sup>	X	X	X	X
TDS	X	X	X	X
Mercury		X		X
Selenium		X		X
Volatile Org.		X		X
Acid Extrac.		X		X

- Notes:
1. Monitoring wells MW-1, 2, 3, 4, 5, 6 and 7, EDW-2 and 3.
  2. Surface water locations SW-1, 2, 3 and 7.
  3. Measured in the field.

## Section 6

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1"=2,000'

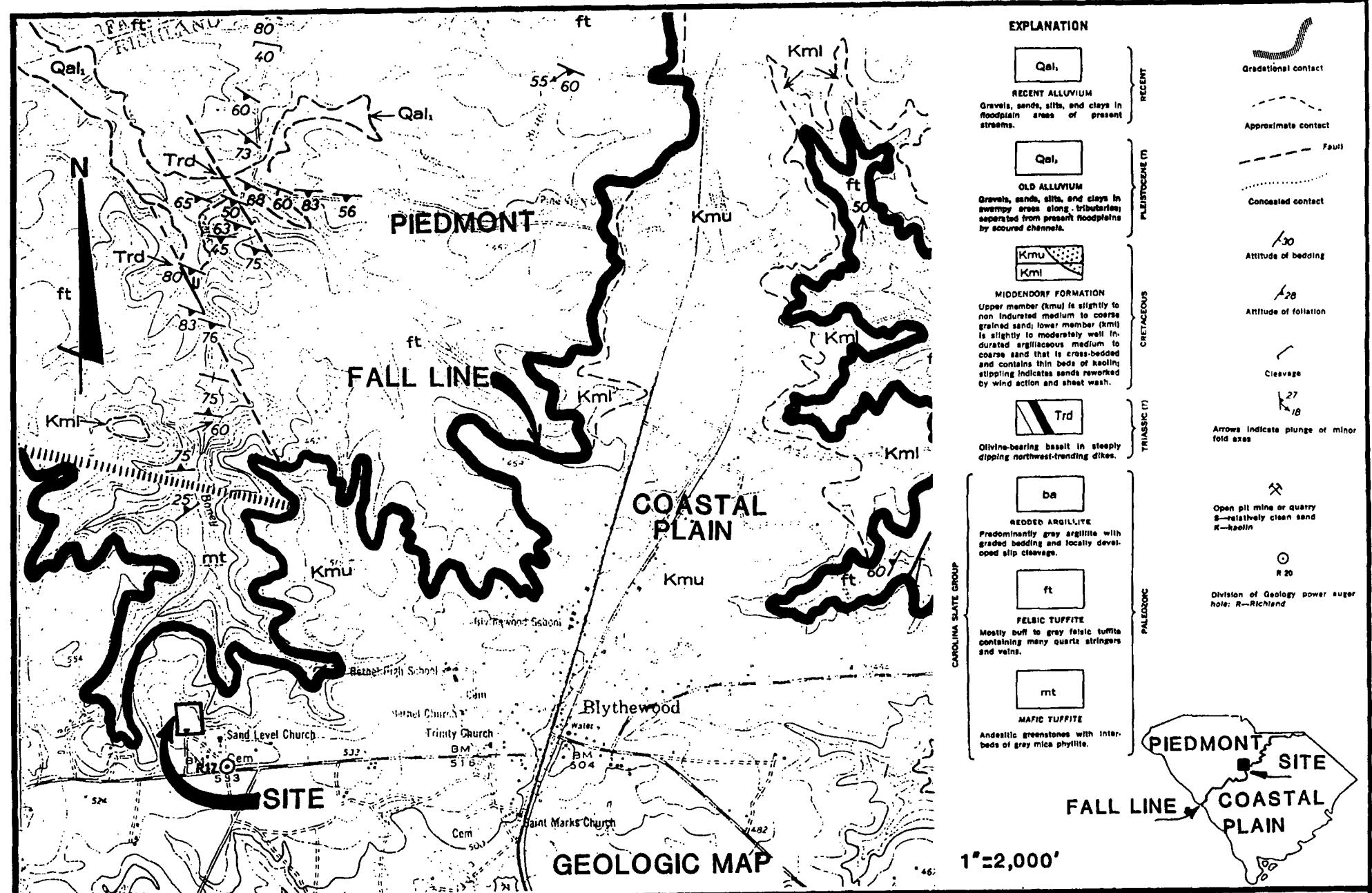
### PROJECT LOCATION MAP

PROJECT LOCATION



POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

FIGURE 1

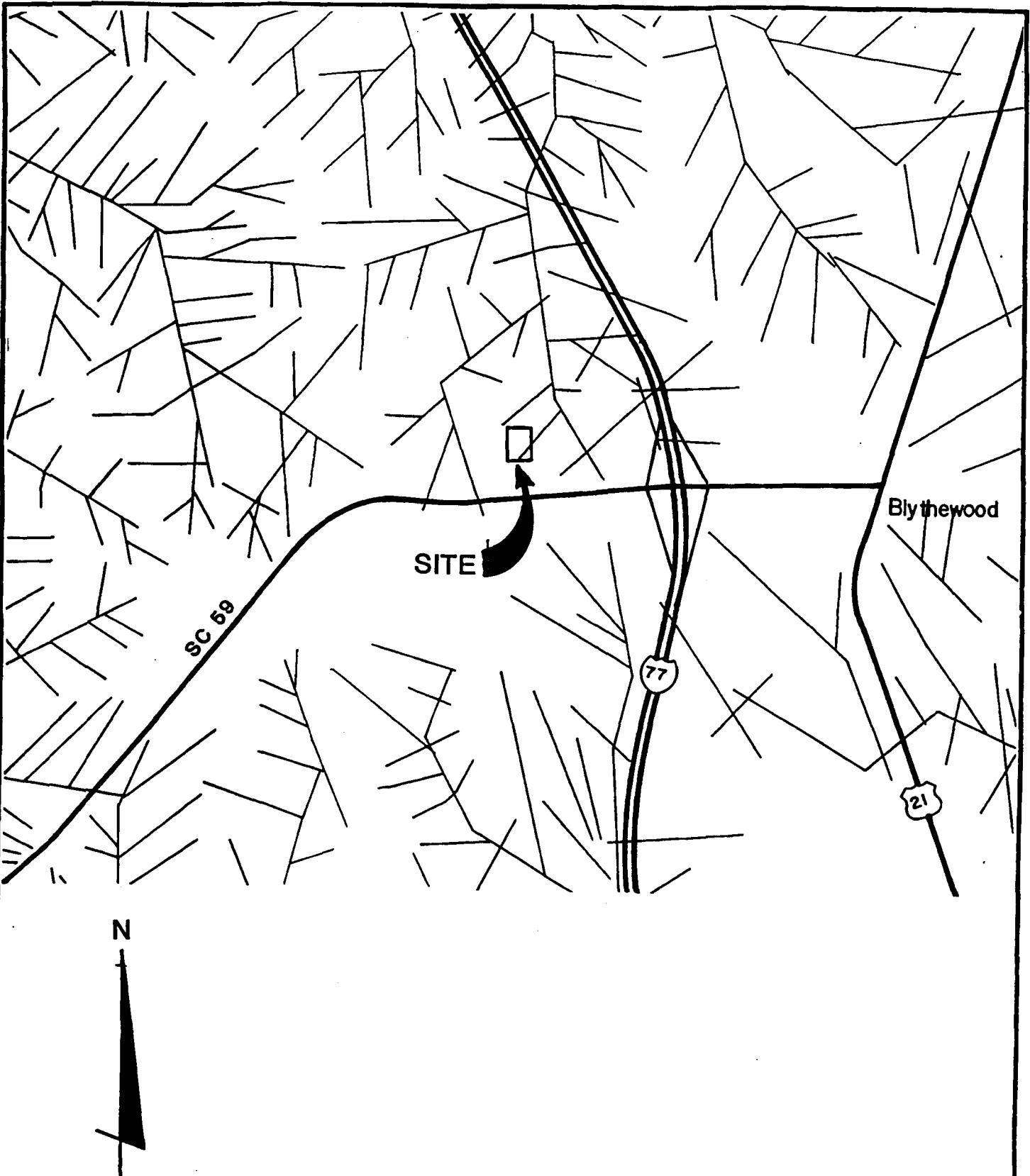


**PBSI**

POST, BUCKLEY, SCHUH & JERNIGAN, INC.

KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

**FIGURE 2**



1" = 2,000'

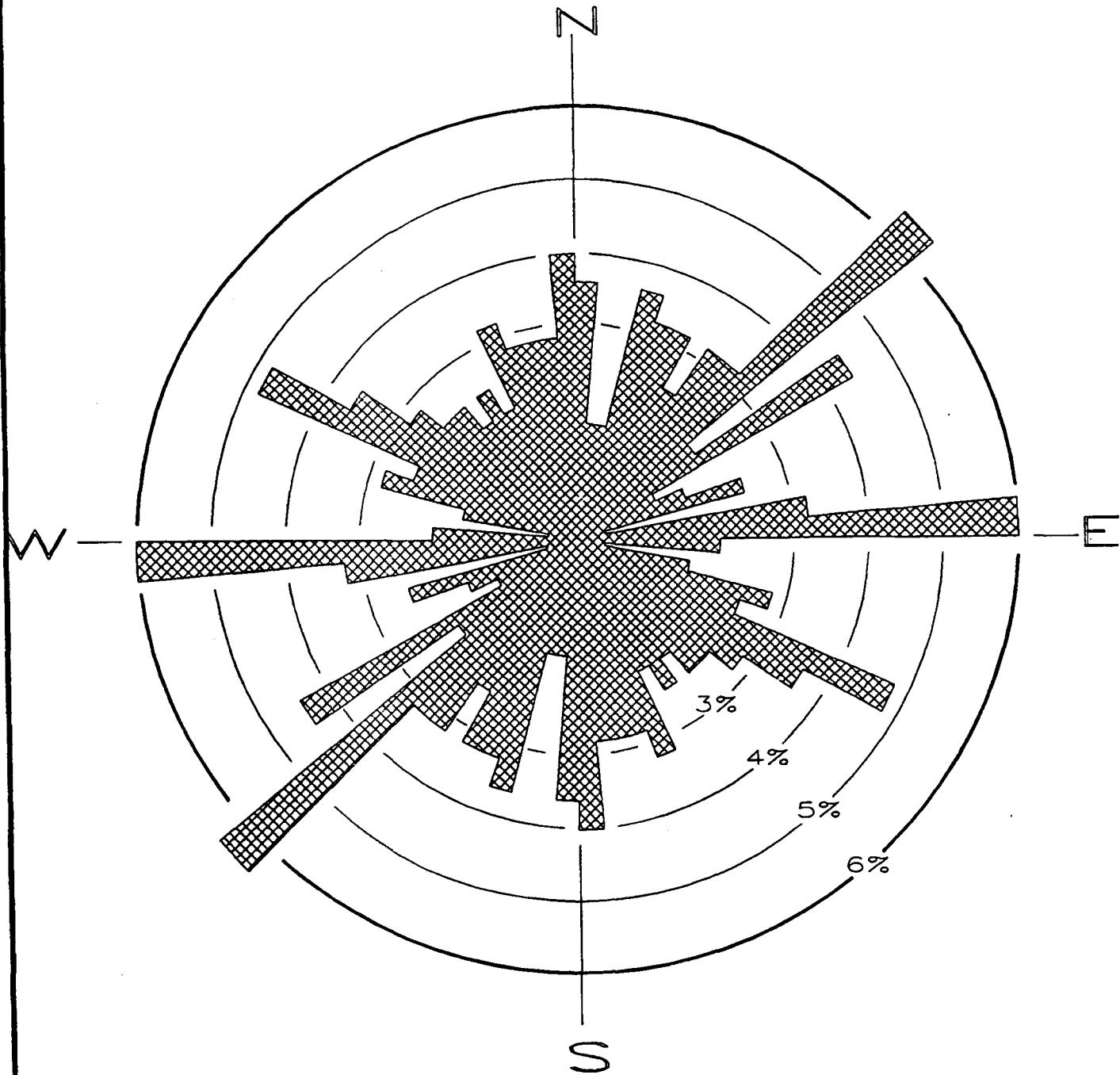
### FRACTURE TRACE MAP

214369

**PBSI**

POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

**FIGURE 3**

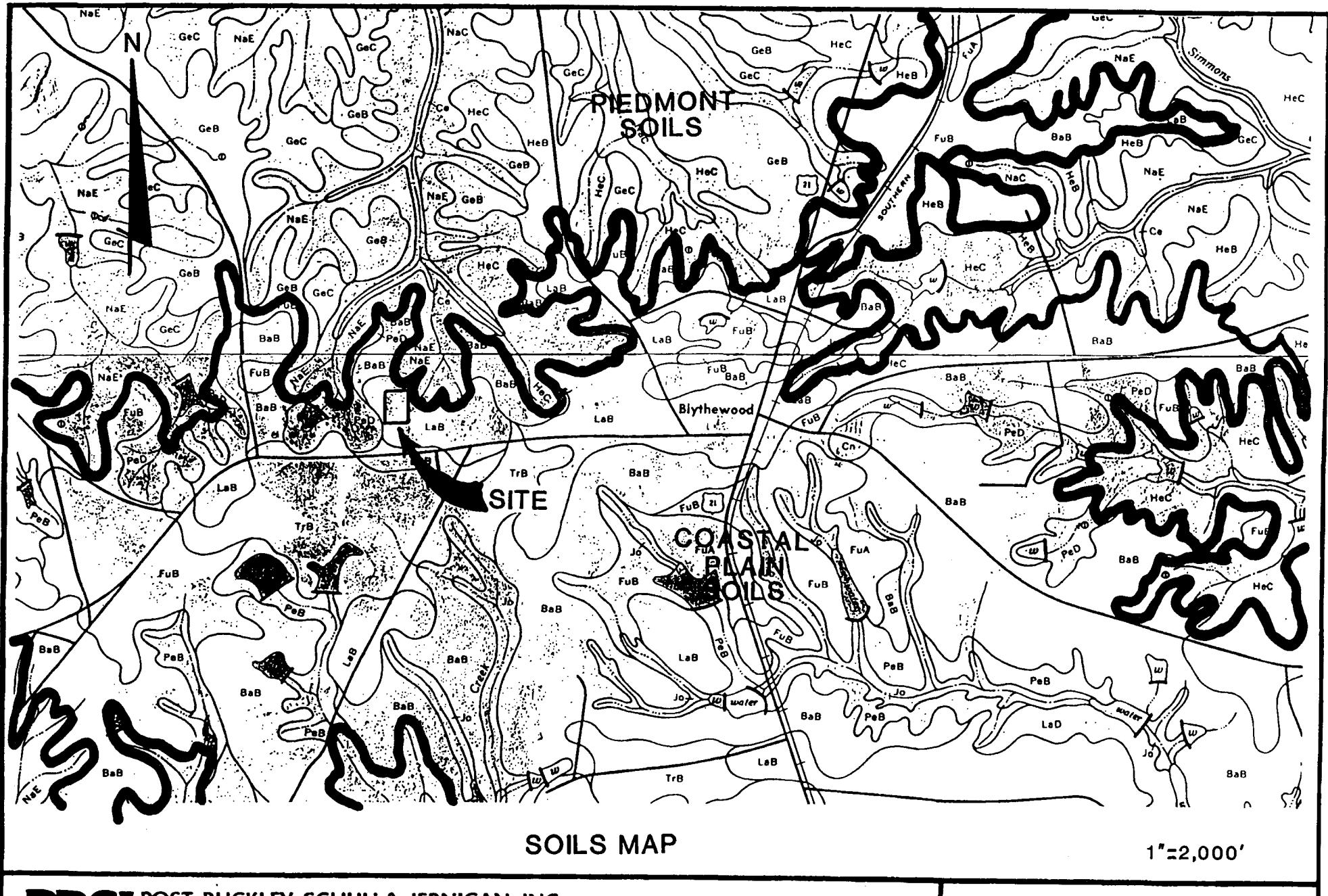


FRACTURE ORIENTATION FREQUENCY ROSE

**PBS**

POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
KING'S LABORATORY, INC.  
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FIGURE 4

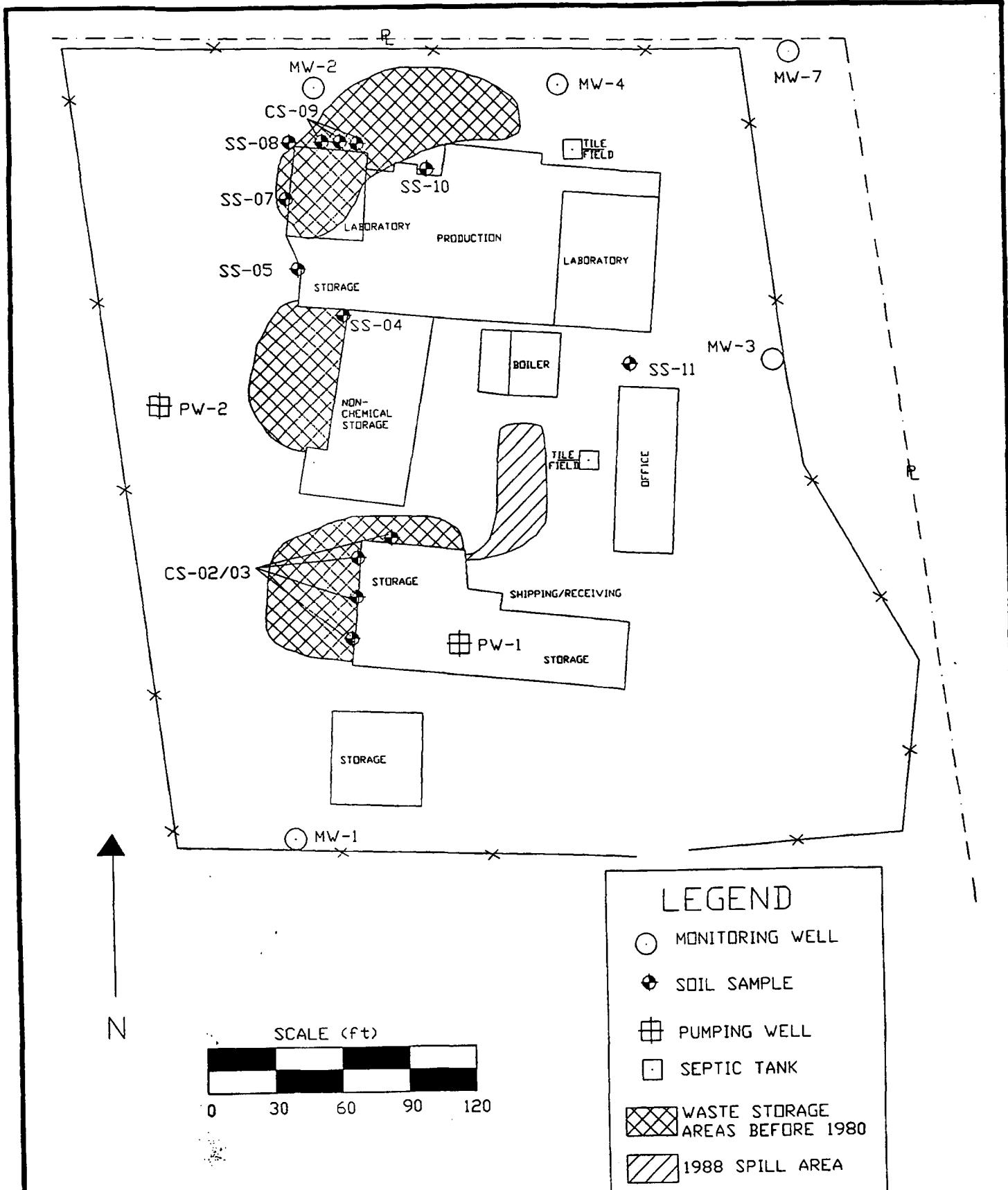


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POST, BUCKLEY, SCHUH & JERNIGAN, INC.

KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

**FIGURE 5**

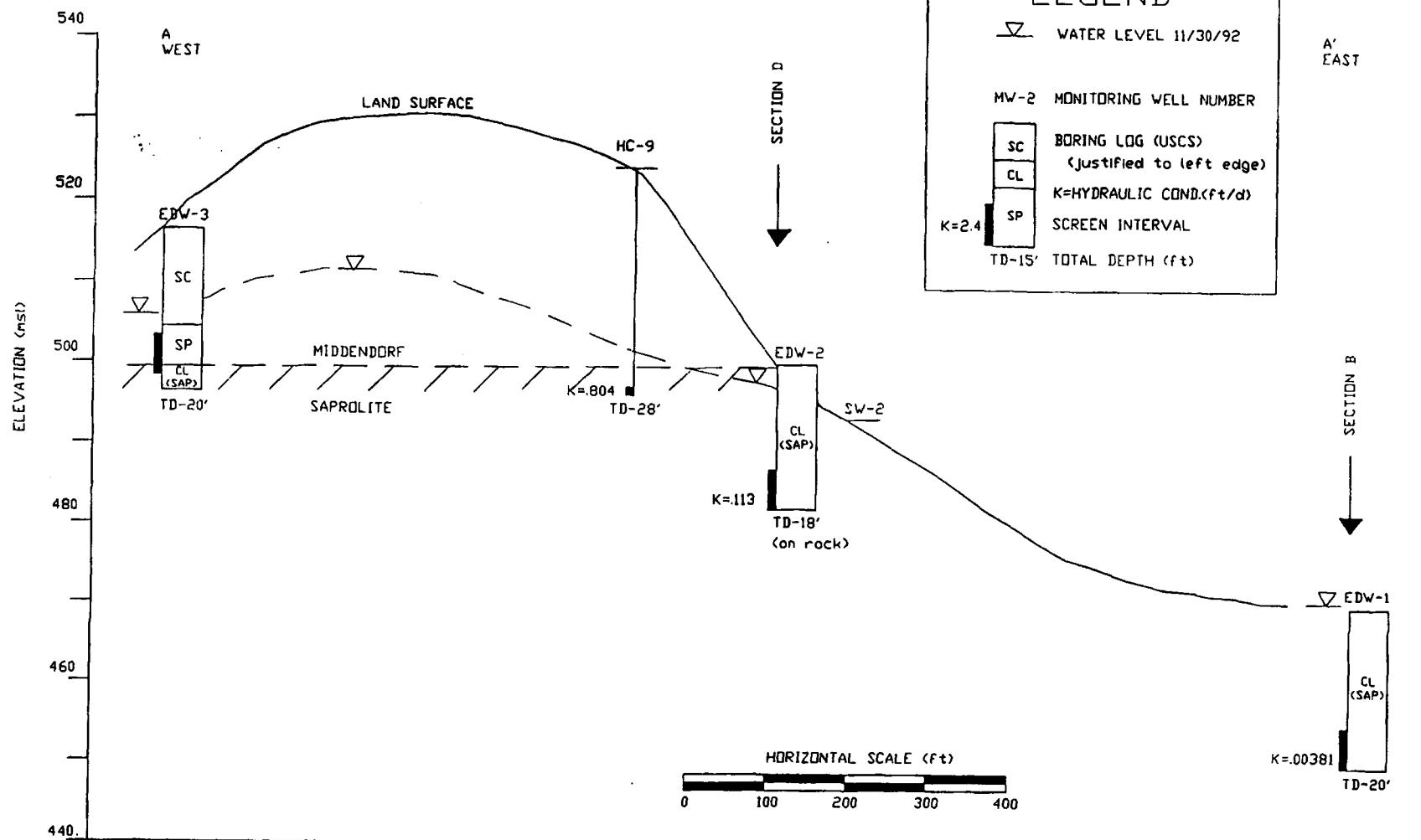


## LOCATIONS OF PRINCIPLE SITE ACTIVITIES



POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

FIGURE 6

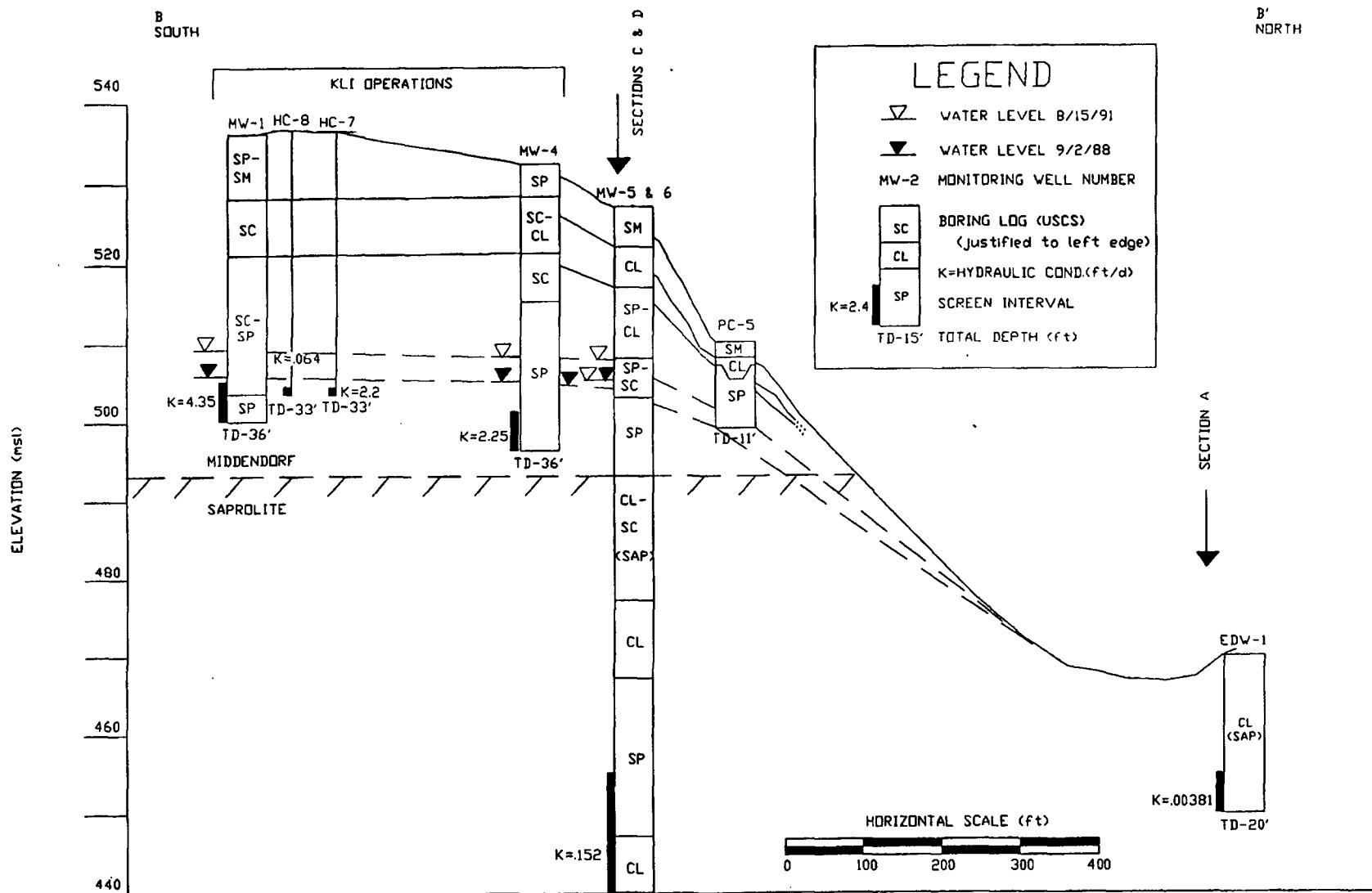


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KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

FIGURE 7



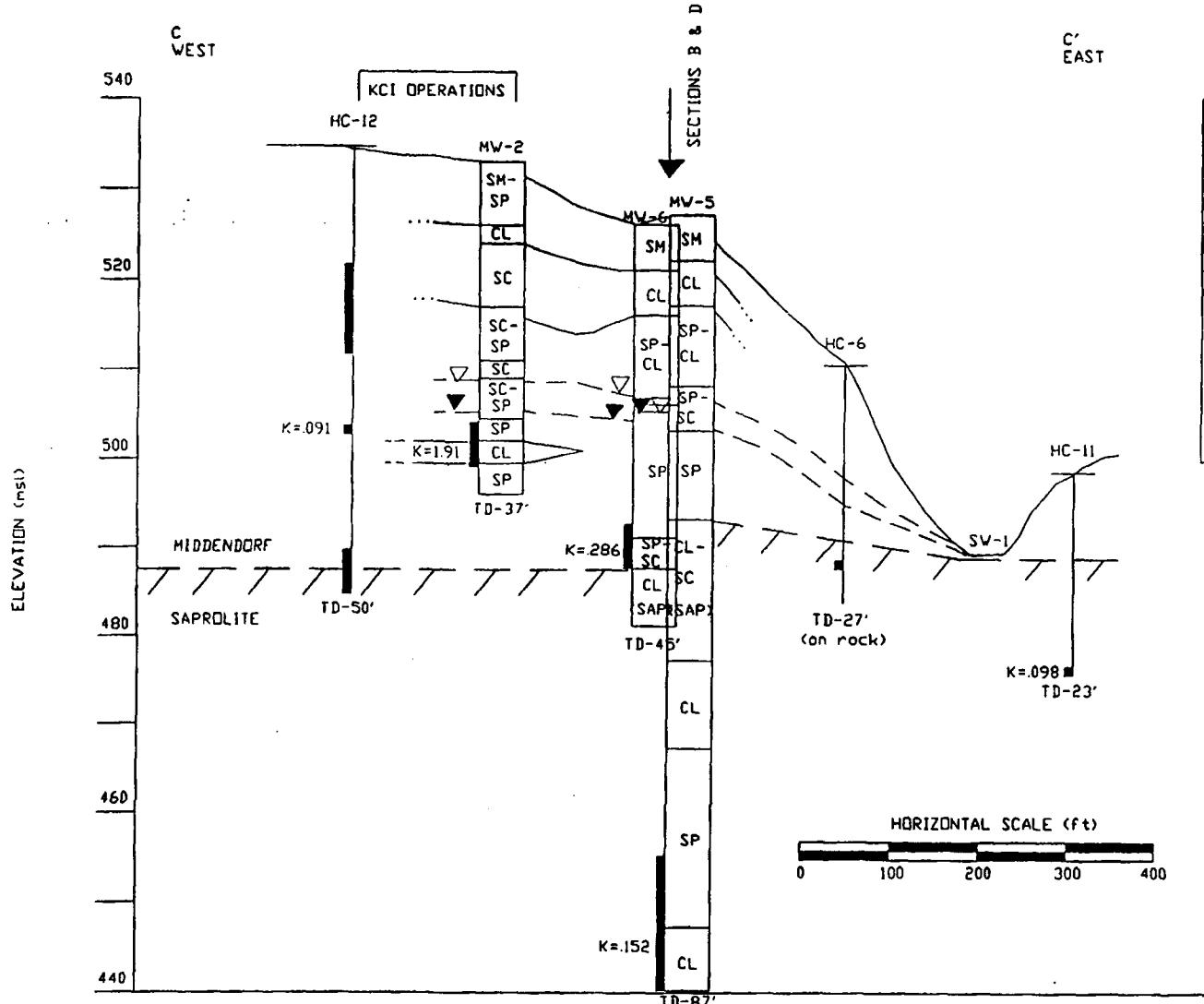
HYDROGEOLOGIC SECTION B-B'

**PBSJ**

POST, BUCKLEY, SCHUH & JERNIGAN, INC.

KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

FIGURE 8

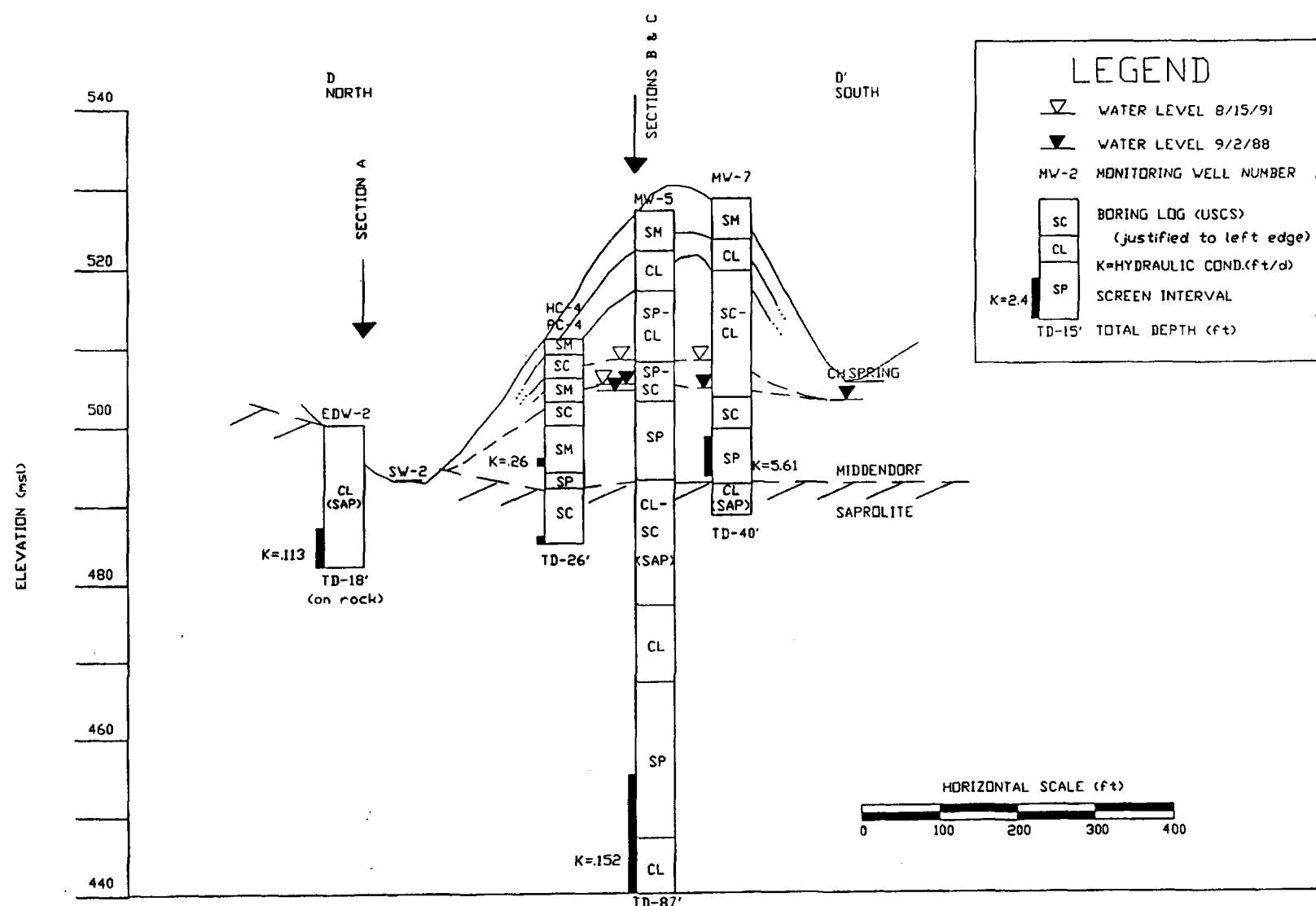


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KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

**FIGURE 9**

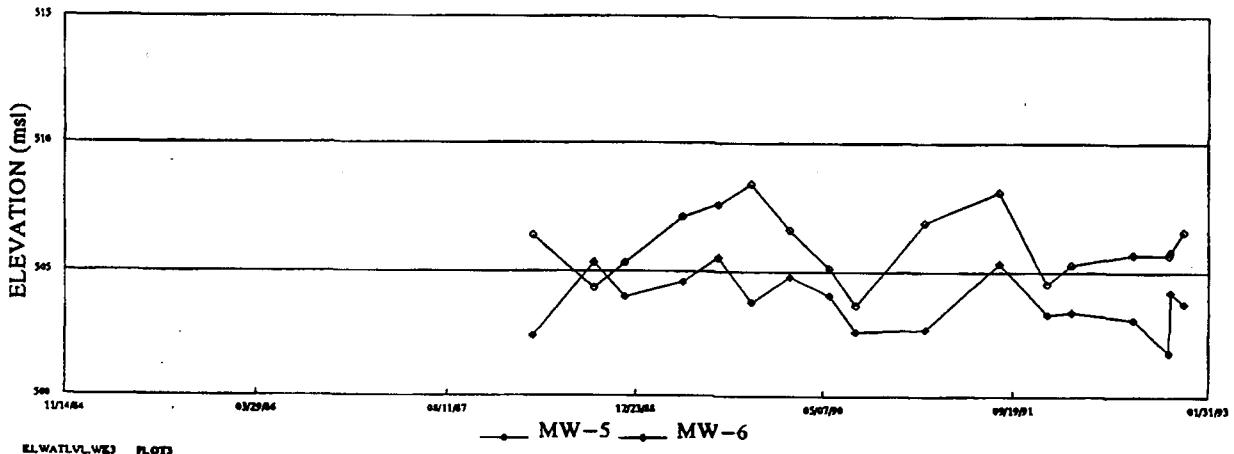
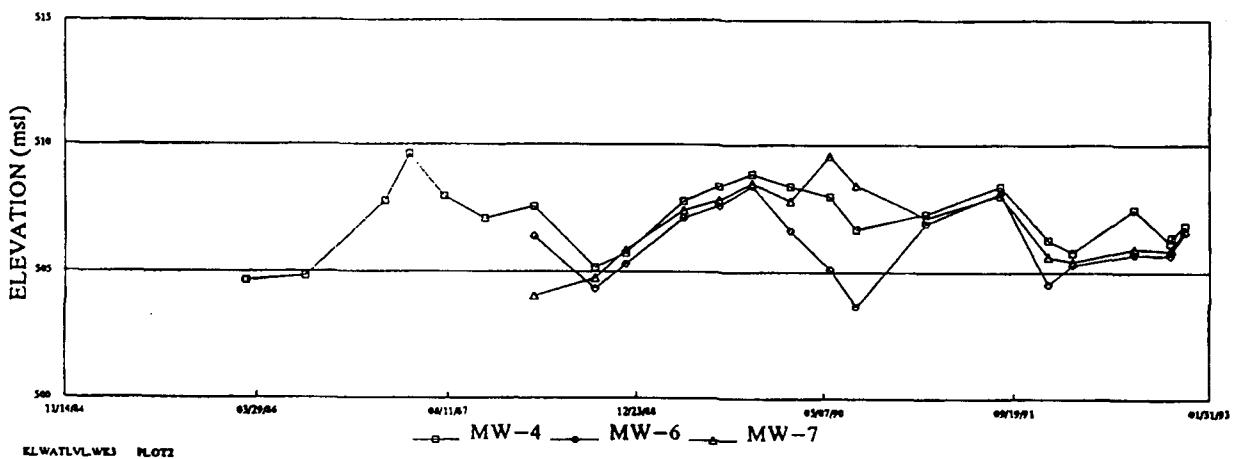
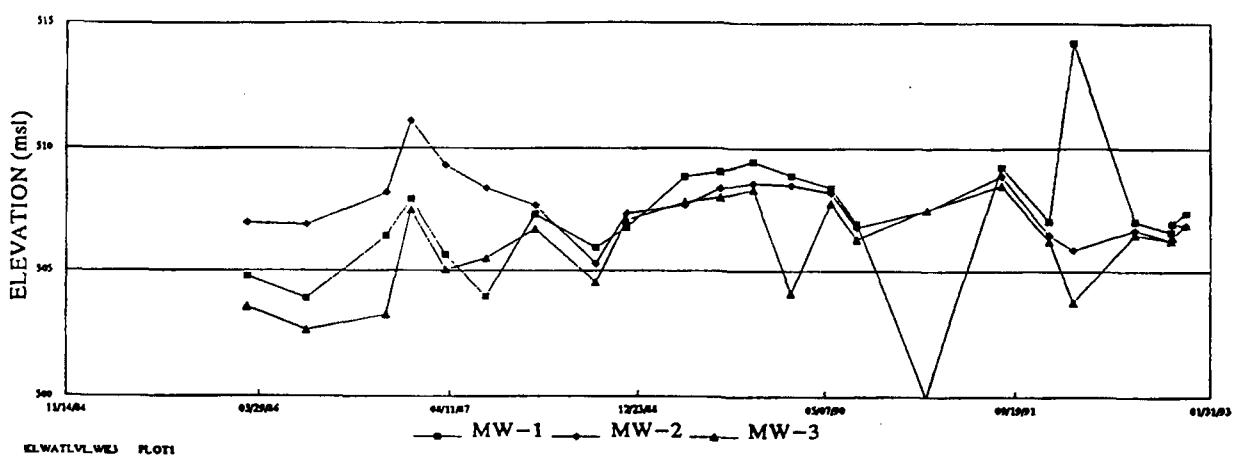


**PBSI**

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KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

**FIGURE 10**



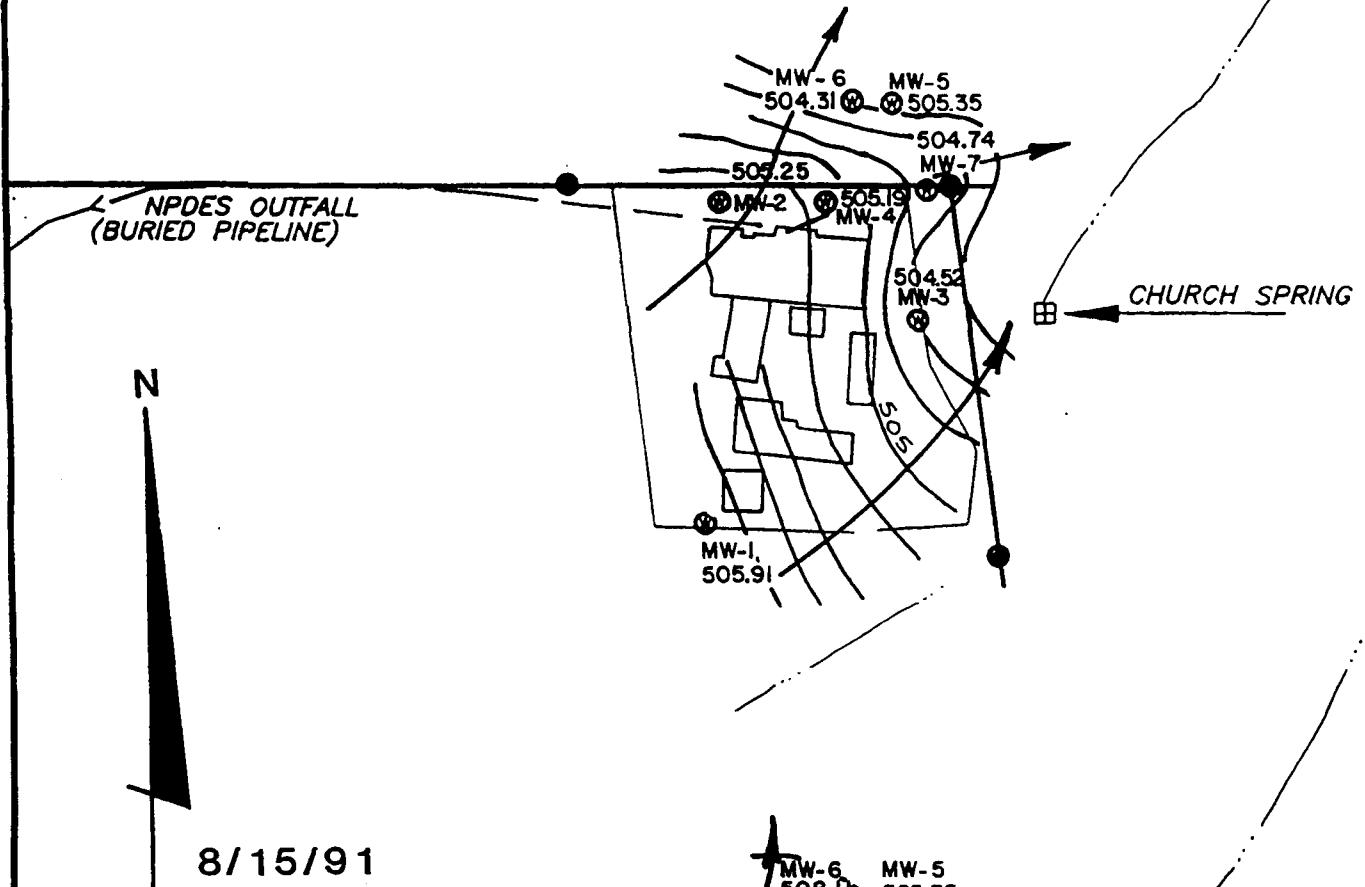
### MONITORING WELL HYDROGRAPHS



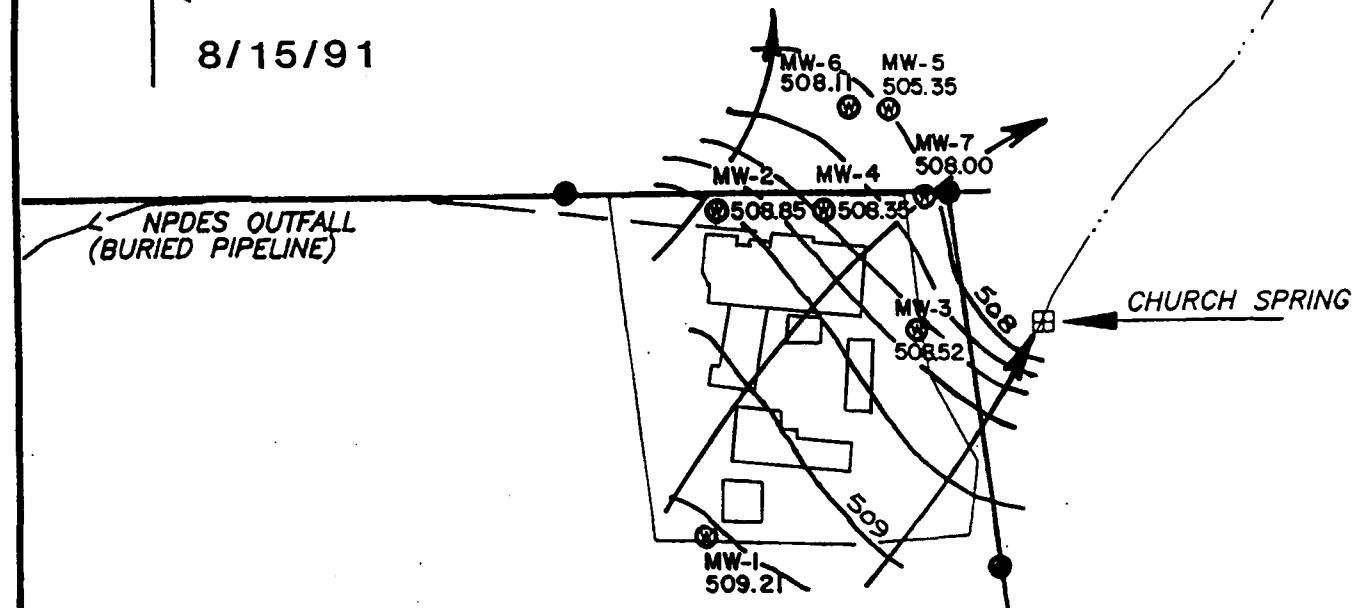
POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

FIGURE 11

9/2/88



8/15/91



### POTENTIOMETRIC MAPS FOR MIDDENDORF AQUIFER

SCALE: 1": 200'



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KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

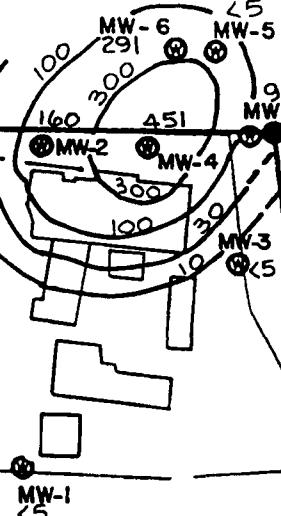
FIGURE 12

11/22/88

NPDES OUTFALL  
(BURIED PIPELINE)

N

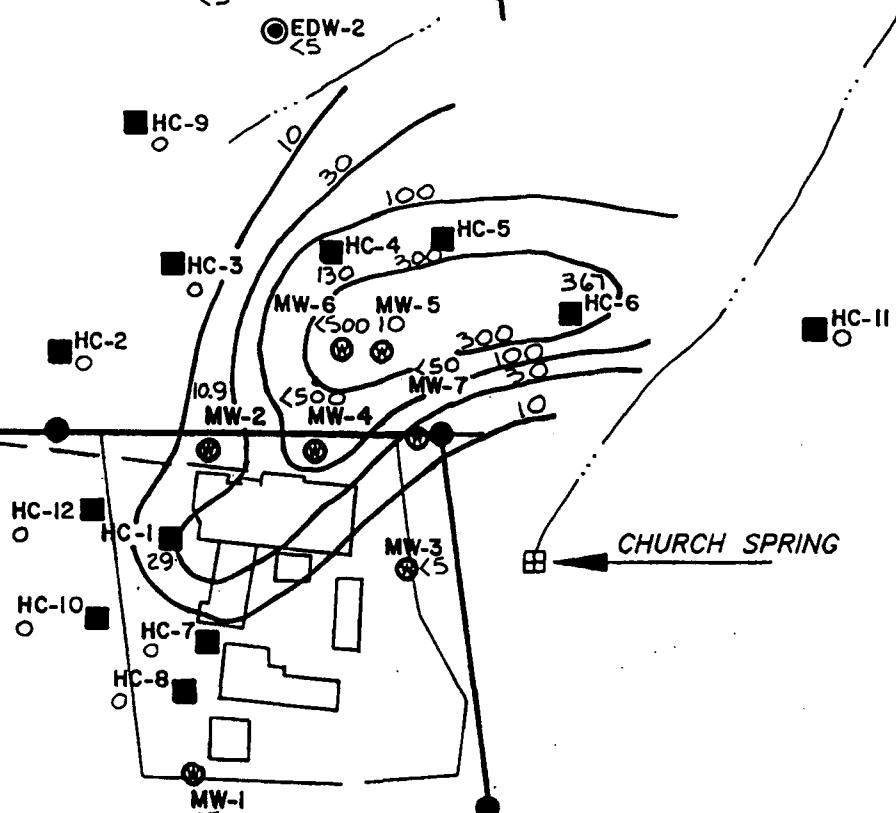
CHURCH SPRING



10/26/92

NPDES OUTFALL  
(BURIED PIPELINE)

CHURCH SPRING



CONTOUR LEVELS = ug/l

### BENZENE PLUME

SCALE: 1" = 200'



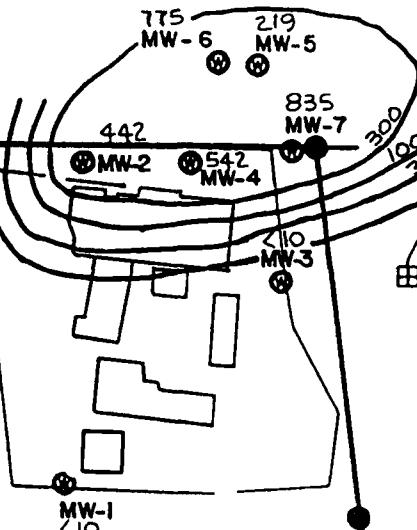
POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

FIGURE 13

11/88

NPDES OUTFALL  
(BURIED PIPELINE)

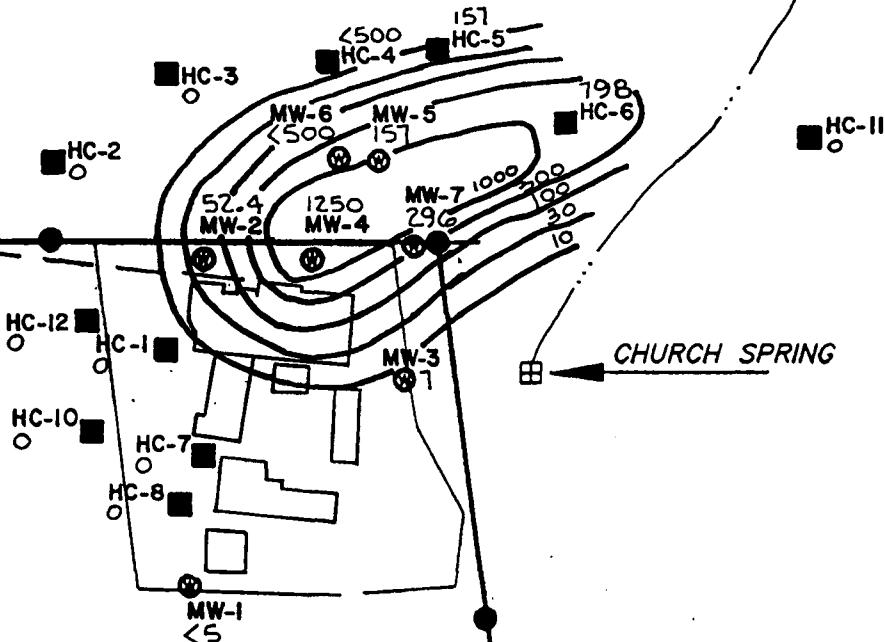
N



10/29/92

NPDES OUTFALL  
(BURIED PIPELINE)

CHURCH SPRING



CONTOUR LEVELS = ug/l

### CHLOROFORM PLUME

SCALE: 1" = 200'



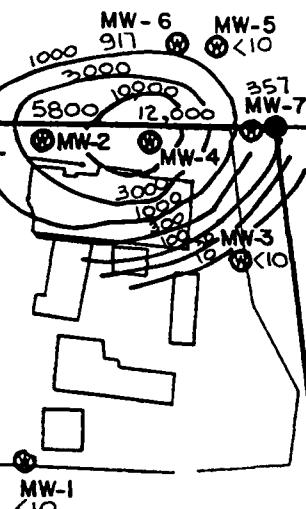
POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

FIGURE 14

11/88

NPDES OUTFALL  
(BURIED PIPELINE)

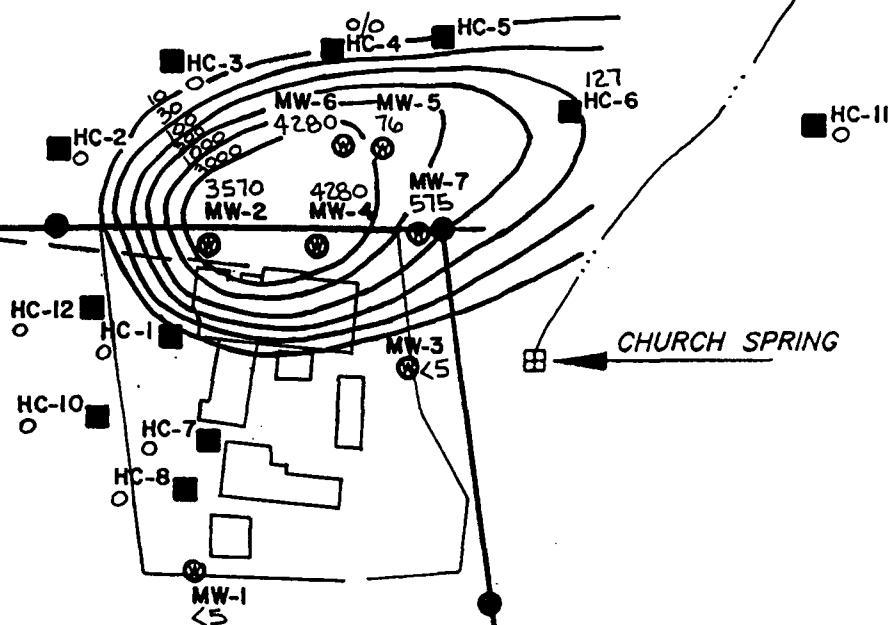
N



CHURCH SPRING

10/92

NPDES OUTFALL  
(BURIED PIPELINE)



CONTOUR LEVELS = ug/l

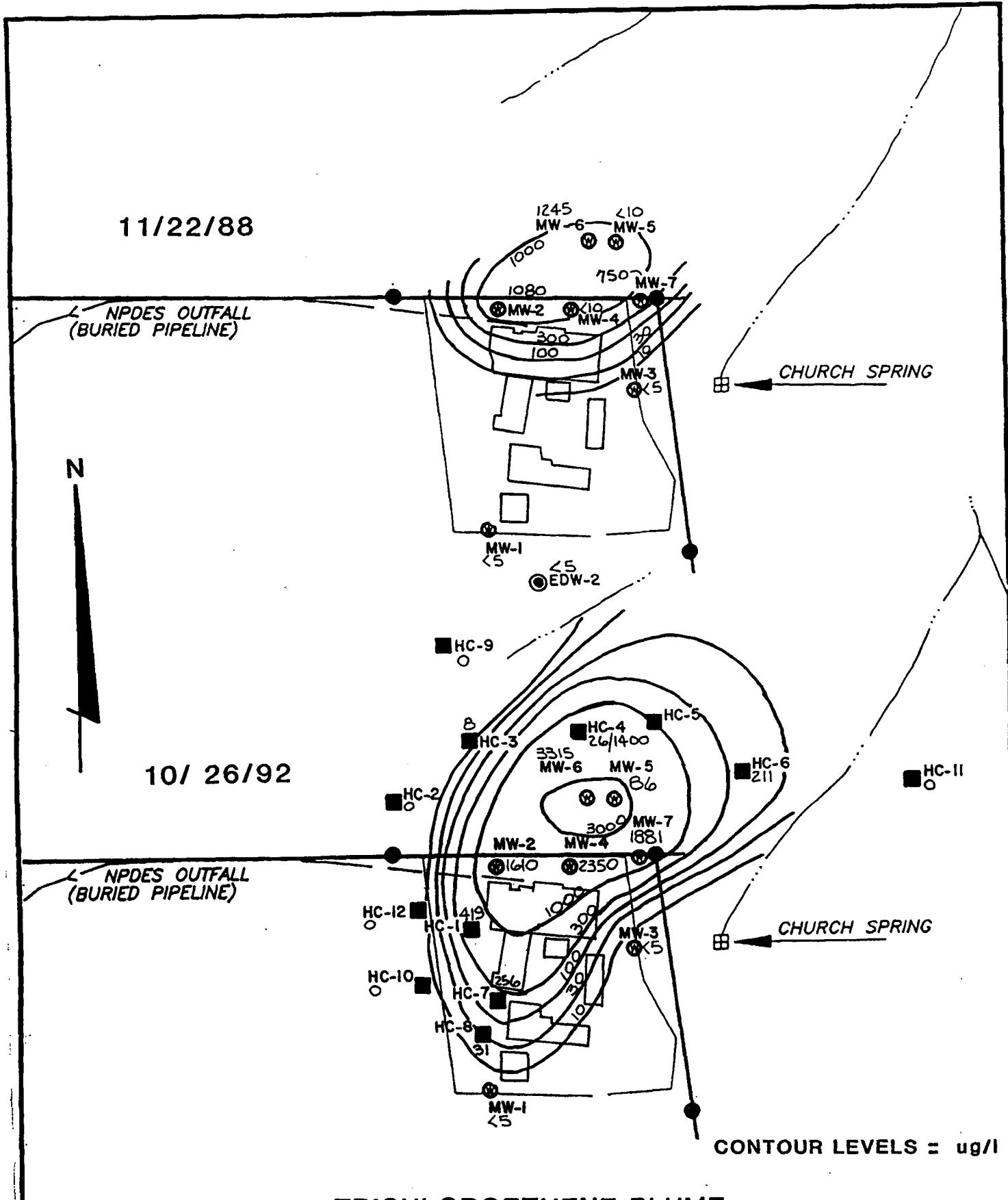
### METHYLENE CHLORIDE PLUME

SCALE: 1" = 200'

PBS

POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

FIGURE 15

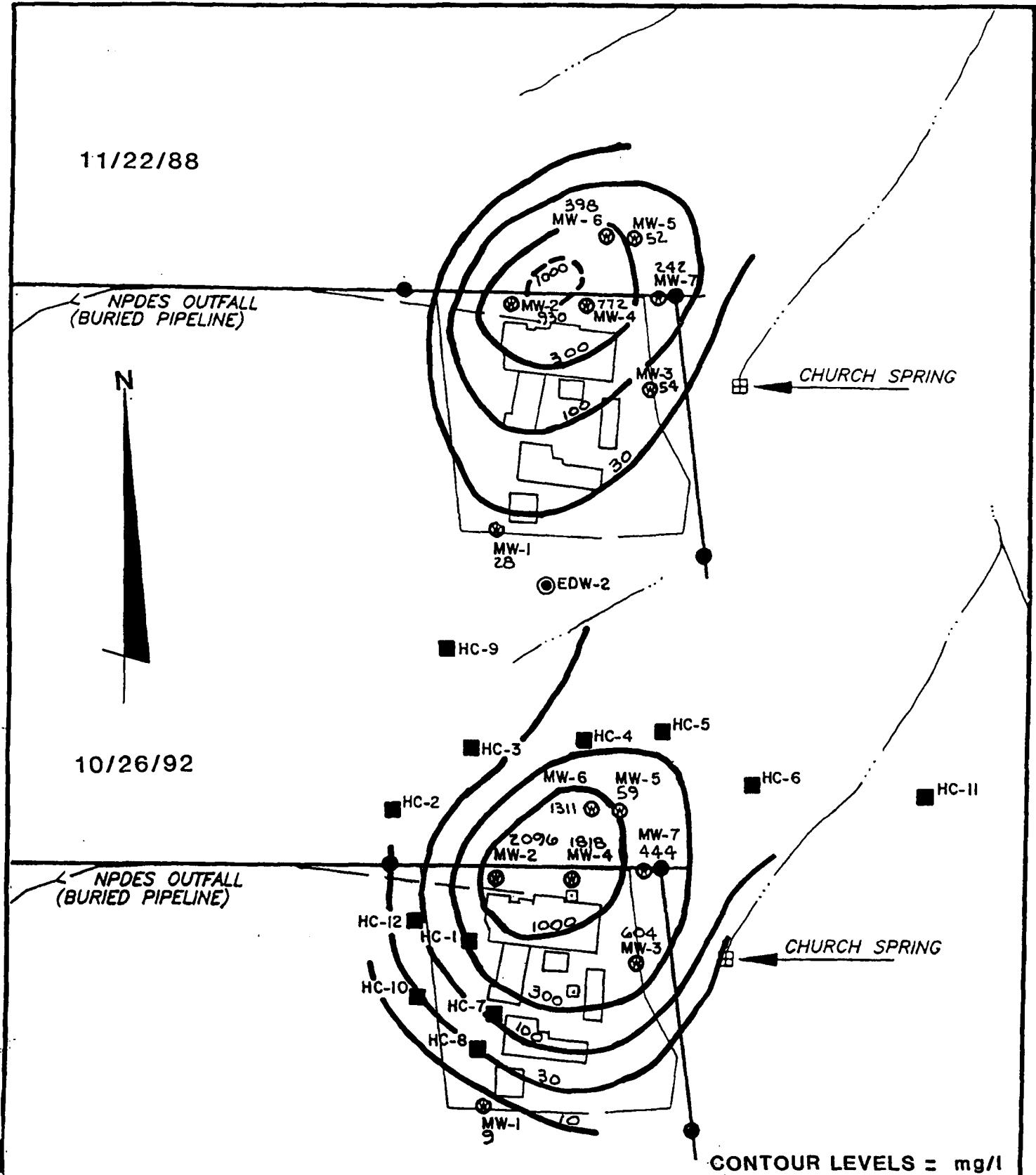


**PBS**

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FIGURE 16

11/22/88



PBSJ

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BLYTHEWOOD, S.C.

**TABLES**

TABLE 1  
GROUNDWATER MONITORING POINT INVENTORY

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

Location I.D.	Completion Date	Northing <sup>1</sup>	Easting <sup>1</sup>	Elevation (ft. MSL) <sup>1</sup>			Boring Depth	Open Interval	Aquifer Monitored
				GL	IC	OC			
		(feet)	(feet)				(feet)	(feet)	
MW-1	5/24/83	10346.6	9907.7	536.22	537.91	538.45	36	31-36	Middendorf
MW-2	5/24/83	10686.1	9921.5	533.01	534.85	535.31	37	29-34	Middendorf
MW-3	5/24/83	10560.4	10127.0	534.11	535.52	536.05	36	25-29	Middendorf
MW-4	9/27/84	10685.7	10031.7	532.34	533.85	534.20	36	31-36	Middendorf
MW-5	3/21/88	10788.8	10099.7	526.97	528.65	528.75	87	72-87	Saprolite
MW-6	3/15/88	10791.4	10058.8	525.93	527.11	527.49	45	33.5-38.5	Middendorf
MW-7	3/15/88	10698.9	10136.6	528.25	529.50	529.86	40		Middendorf
EDW-1	4/18/89	11351.0	10634.9	469.81	471.08	471.37	20	15-20	Saprolite
EDW-2	4/18/89	11116.0	9994.3	500.07	501.28	501.38	18	13-18	Saprolite
EDW-3	4/17/89	10861.1	9289.8	516.33	516.66	516.76	20	13-18	Middendorf
PZ-1-35	10/16/92	10507.1	9804.5	536.08	539.17	539.14	35	30-35	Middendorf
PZ-2-27	10/17/92	10619.7	9803.1	534.45	537.20	537.31	27	22-27	Middendorf
PZ-2-50	10/17/92	10619.7	9803.1	534.45	537.19	537.31	50	45-50	Saprolite
HC-1-33	10/14/92	10589.9	9882.3	534.49	--	--	33	32-33	Middendorf
HC-2-32	10/15/92	10784.3	9769.5	531.46	--	--	32	31-32	Middendorf
HC-2-52	10/17/92	10784.3	9769.5	531.46	--	--	55	51-52	Saprolite <sup>2</sup>
HC-3-33	10/15/92	10876.5	9884.1	527.36	--	--	33	32-33	Middendorf
HC-4-16	10/13/92	10889.4	10048.2	510.77	--	--	16	15-16	Middendorf
HC-4-26	10/13/92	10889.4	10048.2	510.77	--	--	26	25-26	Saprolite
HC-5-11	10/14/92	10901.7	10163.8	510.37	--	--	11	None	None
HC-6-23	10/16/92	10824.9	10297.0	510.52	--	--	23	22-23	Middendorf(?)
HC-7-33	10/15/92	10480.2	9921.3	536.29	--	--	33	32-33	Middendorf
HC-8-33	10/15/92	10432.6	9896.3	536.61	--	--	33	32-33	Middendorf
HC-9-28	10/15/92	11020.8	9846.4	523.98	--	--	28	27-28	Middendorf
HC-10-38	10/16/92	10507.1	9804.5	536.08	--	--	38	37-38	Middendorf(?)
HC-11-23	10/17/92	10808.8	10548.6	498.16	--	--	23	22-23	Saprolite
HC-12-32	10/17/92	10619.7	9803.2	534.45	--	--	32	31-32	Middendorf
PW-1	1970	10433.4	9982.9	--	537.80	--	?	?	Bedrock
PW-2	1987	10539.3	9849.8	--	536.46	--	500	140-500	Bedrock
Church Spring	N/A	10568.5	10258.0	505.32	506.83	--	N/A	0-3	Middendorf

Note 1: GL-ground level; IC-inner casing; OC-outer casing; Northing and Easting to local grid on plat north.

**TABLE 2**  
**REGULATORY LEVELS FOR COMPOUNDS FOUND IN THE ON-SITE GROUNDWATER**

**KING'S LABORATORY, INC.**  
**BLYTHEWOOD, SOUTH CAROLINA**

Regulatory Levels			
	Level	Type	Date
<b>GENERAL:</b>			
Temperature	C	None	- -
pH	SU	6.5-8.5	NSDWR -
Alkalinity	mg/L	None	- -
DOC	mg/L	None	- -
TOC	mg/L	None	- -
TDS	mg/L	500	NSDWR -
Specific Conductance	umho/cm <sup>3</sup>	None	- -
<b>INORGANICS:</b>			
Barium	mg/L	2.000	Primary MCL 7/91
Cadmium	mg/L	0.005	Primary MCL 1/91
Calcium	mg/L	None	- -
Chloride	mg/L	250	NSDWR -
Chromium	mg/L	0.100	Primary MCL 1/91
Cyanide	mg/L	0.200	Proposed MCL 7/90
Fluoride	mg/L	4.0	Primary MCL 4/86
Iron	mg/L	0.3	NSDWR -
Lead	mg/L	0.015	Primary MCL 6/90
Magnesium	mg/L	None	- -
Manganese	mg/L	0.05	NSDWR -
Mercury	mg/L	0.002	Primary MCL 1/91
Nickel	mg/L	0.1	Proposed MCL 7/90
Nitrate	mg/L	10	Primary MCL 1/91
Potassium	mg/L	None	- -
Selenium	mg/L	0.050	Primary MCL 1/91
Sodium	mg/L	None	- -
Sulfate	mg/L	250	NSDWR -
Zinc	mg/L	5	NSDWR -

Regulatory Levels			
	Level	Type	Date
<b>VOLATILE ORGANICS:</b>			
Acetone	ug/L	None	- -
Benzene	ug/L	5	Primary MCL 7/87
Bromoform	ug/L	* 100	NPDWR -
Carbon Tetrachloride	ug/L	5	Primary MCL 7/87
Chlorobenzene	ug/L	100	Primary MCL 1/91
Chloroform	ug/L	* 100	NPDWR -
Dichlorobenzene, 1,2-	ug/L	75	Primary MCL 7/87
Dichlorobenzene, 1,3-	ug/L	None	- -
Dichlorobenzene, 1,4-	ug/L	5	SMCL 1/91
Dichloroethane,1,1-	ug/L	None	- -
Dichloroethane,1,2-	ug/L	5	Primary MCL 7/87
Ethylbenzene	ug/L	700	Primary MCL 1/91
Methylene Chloride	ug/L	5	Proposed MCL 7/90
Tetrachloroethene	ug/L	5	Primary MCL 1/91
Toluene	ug/L	1000	Primary MCL 1/91
Trichloroethane, 1,1,1-	ug/L	200	Primary MCL 7/87
Trichloroethane, 1,1,2-	ug/L	None	- -
Trichloroethene	ug/L	5	Primary MCL 7/87
m-Xylene	ug/L	+ 10,000	Primary MCL 1/91
o-Xylene	ug/L	+ 10,000	Primary MCL 1/91
<b>SEMI-VOLATILE ORGANICS:</b>			
o-Cresol	ug/L	None	- -
N-Nitrosodiphenylamine	ug/L	None	- -
Naphthalene	ug/L	None	- -
Nitrobenzene	ug/L	None	- -
Pentachlorophenol	ug/L	1	Primary MCL 7/91
Phenols	ug/L	None	- -
Tetrachlorophenol, 2,3,4,6-	ug/L	None	- -

\* Total THM's <100 ug/L

+ Total Xylenes <10,000 ug/L

TABLE 3  
LIST OF APPENDIX IX COMPOUNDS USED ON SITE

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

Compound	Synonym	Remarks
Acetone	2-Propanone	
Acetophenone	Ethanone, 1-phenyl-	
Acetonitrile	Methyl Cyanide	Lab quantities, only
Acrolein	2-Propenal	
Allyl Chloride	1-Propene, 3-chloro-	
Aniline	Benzenamine	Lab quantities, only
Benzene	Benzene	
Benzyl alcohol	Benzenemethanol	
Carbon disulfide	Carbon disulfide	Lab quantities, only
Carbon tetrachloride	Methane, tetrachloro-	
Chlorobenzene	Benzene, chloro-	
Chloroform	Methane, trichloro-	
p-Cresol	Phenol, 4-methyl-	
Cyanide	Cyanide	
o-Dichlorobenzene	Benzene, 1,2-dichloro	
1,2-Dichloroethane	Ethane, 1,2-dichloro-	
m-Dinitrobenzene	Benzene, 1,3-dinitro-	
1,4-Dioxane	1,4-Dioxane	
Hexachlorobenzene	Benzene, hexachloro	Lab quantities, only
Isobutyl alcohol	1-Propanol, 2-methyl-	
Isophorone	2-Cyclohexen-1-one, 3,5,5-trimethyl-	
Methyl bromide	Methane, bromo-	
Methyl ethyl ketone	2-Butanone	
Methyl iodide	Methane, iodo-	
Methylene chloride	Methane, dichloro-	
Naphthalene	Naphthalene	
Nitrobenzene	Benzene, nitro-	
Pentachlorophenol	Phenol, pentachloro-	
Phenol	Phenol	
Pyridine	Pyridine	
Toluene	Benzene, methyl-	
o-Toluidine	Benzenamine, 2-methyl	Lab quantities, only
Trichloroethene	Ethene, trichloro-	
Xylenes (total)	Benzene, dimethyl	
Chromium	Chromium	
Copper	Copper	
Lead	Lead	
Mercury	Mercury	
Thallium	Thallium	Lab quantities, only
Zinc	Zinc	Lab quantities, only

TABLE 4  
SUMMARY OF SOIL ANALYSES

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

Page 1

Sample ID Date Sampled: Laboratory	SS-01	SS-02	SS-03	CS-02/03	SS-04		SS-05		SS-06	SS-07		SS-08		CS-09		
	11/27/90 DHEC	11/27/90 DHEC	11/27/90 DHEC	10/27/92 CAL	11/27/90 DHEC	10/27/92 CAL	11/27/90 DHEC	10/27/92 CAL	11/27/90 DHEC	11/27/90 DHEC	10/27/92 CAL	11/27/90 DHEC	10/27/92 CAL	11/27/90 DHEC	10/27/92 CAL	
<b>INORGANICS:</b>																
Arsenic	mg/kg	0.5U	0.5U	0.5U	-	0.5U	-	0.5U	0.5U	0.5U	-	0.5U	-	0.5U	-	
Barium	mg/kg	5.0U	40	5	76	8.4	6	7	11	0.5U	9	9	6.4	6	5	
Cadmium	mg/kg	1.0U	1.0U	1.0U	-	1.0U	-	1.0U	-	1.0U	-	1.0U	-	1.0U	-	
Chromium	mg/kg	1.0U	8.00	27	13	18	3.3	5.5	4	1.3	12	2.7	8.1	4.4	19	
Copper	mg/kg	1.0U	7.2	6.8	-	4.9	-	1.4	-	3.7	5.8	-	11	-	16	
Lead	mg/kg	5.0U	23	13	95	7.1	41	5.0U	14	5.0U	5.0U	18	5.0U	9	5.0U	
Magnesium	mg/kg	17	550	82	-	150	-	59	-	26	300	-	310	-	75	
Manganese	mg/kg	9	150	28	-	16	-	22	-	3.2	24	-	13	-	7.9	
Mercury	mg/kg	0.25U	0.25U	0.25U	0.2	0.25U	0.13	0.25U	0.57	0.25U	0.25U	0.11	0.32	0.6	0.25U	
Nickel	mg/kg	2.0U	5.4	2.0U	-	2.0U	-	2.0U	-	2.0U	2.8	-	2.0U	-	1.7	
Selenium	mg/kg	0.5U	0.5U	2.2	0.07	0.5U	0.09	0.5U	0.06	0.5U	0.5U	0.05	0.6	<0.05	0.8	
Silver	mg/kg	3.1	3.2	3.0U	-	4.5	-	3.2	-	3.0U	4.9	-	3	-	4.9	
<b>VOLATILE ORGANICS:</b>																
Azobenzene	ug/kg	300U	300U	300U	-	300U	-	300U	-	300U	-	300U	-	300U	-	
Bromoform	ug/kg	20U	20U	20U	<100	20U	<100	20U	<100	20U	<100	43000	<100	20U	<100	
Trichloroethane,1,1,1-	ug/kg	-	-	-	<100	-	<100	-	<100	-	<100	-	101	-	103	
Trichloroethene	ug/kg	-	-	-	151	-	<100	-	<100	-	<100	-	<100	-	<100	
<b>SEMI-VOLATILE ORGANICS:</b>																
Benzoic Acid	ug/kg	300U	300U	1440	-	376	-	300U	-	300U	-	300U	-	300U	-	
Bis(2-ethylhexyl) Phthalate	ug/kg	300U	300U	1340	-	300U	-	300U	-	300U	-	300U	-	300U	-	
PCB 1254	ug/kg	10U	38.2	10U	-	10U	-	10U	-	10U	-	10U	-	10U	-	
Pentachlorophenol	ug/kg	-	-	-	1670	-	<330	-	<330	-	<1670	-	<300	-	<1670	
Phenol	ug/kg	300U	300U	300U	<1670	300U	<330	300U	<330	300U	<1670	390	<300	300U	<1670	
<b>TENTATIVELY IDENTIFIED COMPOUNDS</b> (Refer to Key for List)		A	B, C	D	1, 2, 3	E, F, G	1, 2, 3	A, H	1, 2, 3, 4	A, H, I	A, I, J, K, L	1, 2, 3	F, M, N, O, P, Q, R, S, T, V, W	1, 2, 3	B,I	1, 2, 3

- Not analyzed

**BOLD** Detected

CAL Columbia Analytical Labs

DHEC Department of Health and Environmental Control

TABLE 4  
SUMMARY OF SOIL ANALYSES

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

Page 2

Sample ID Date Sampled: Laboratory	SS-10		SS-11		Natural Range of Inorganics in GA, NC, and SC Soils *	
	11/27/90 DHEC	10/27/92 CAL	11/27/90 DHEC	10/27/92 CAL		
<b>INORGANICS:</b>						
Arsenic	mg/kg	0.5	—	1.2	—	0.3
Barium	mg/kg	7.4	11	9.4	13	15
Cadmium	mg/kg	1.0U	—	2.6	—	—
Chromium	mg/kg	17	2.1	28	27	5
Copper	mg/kg	5.5	—	21	—	2
Lead	mg/kg	8.7	4.3	28	58	10
Magnesium	mg/kg	110	—	200	—	100
Manganese	mg/kg	18	—	41	—	0.03
Mercury	mg/kg	0.25U	0.43	0.025U	0.79	0.02
Nickel	mg/kg	2.0U	—	3.7	—	5
Selenium	mg/kg	1.8	0.16	1.2	4.6	<0.1
Silver	mg/kg	3.3	—	3.1	—	—
<b>VOLATILE ORGANICS:</b>						
Azobenzene	ug/kg	300U	—	883	—	
Bromoform	ug/kg	20U	<100	20U	<100	
Trichloroethane,1,1,1-	ug/kg	—	103	—	106	
Trichloroethylene	ug/kg	—	<100	—	<100	
<b>SEMI-VOLATILE ORGANICS:</b>						
Benzoic Acid	ug/kg	300U	—	300U	—	
Bis(2-ethylhexyl) Phthalate	ug/kg	300U	—	300U	—	
PCB 1254	ug/kg	10U	—	10U	—	
Pentachlorophenol	ug/kg	—	<330	—	<330	
Phenol	ug/kg	300U	<330	300U	<330	
<b>TENTATIVELY IDENTIFIED COMPOUNDS</b> (Refer to Key for List)		X, Y, Z, AA	1, 2, 3	B, C, I, BB	1, 2, 3	

— Not analyzed

**BOLD** Detected

CAL Columbia Analytical Labs

DHEC Department of Health and Environmental Control

\* Reference: USGS Report 81-197

**KEY**

U — Parameter not detected in Sample. Listed Value is the Method Detection Level (MDL)

**TENTATIVELY IDENTIFIED COMPOUNDS (TICs)**

- DHEC Analysis:
- A — 2,4 Hexadiene
- B — Cyclo butane, Ethenyl—
- C — Benzophenone
- D — Hexadecanol
- E — 1,2,4—Trithiolane
- F — Thiocyanic Acid, methylene ester
- G — DiBromomethane
- H — Ethanone, 1-(3-Ethyoxyvanyl)—
- I — 9-Octadecen-1-Ol, (Z)—
- J — 4-Piperidinone, 2,2,6,6-Tetramethyl
- K — Cyclotetradecane
- L — Trans-5-methyl-2-(1-methylethyl)-cyclohexane
- M — 1,3 Dioxolane, 2,2,4-Trimethyl
- N — Benzaldehyde (ACN)
- O — Propoane, 1,2,3-Tribromo
- P — Benzene, 1,3-Dinitro
- Q — Benzene, 2,4, Dibromo-1-methoxy
- R — Cyclohexanone (ACN)
- S — 2,3-Dibromononaphthalene
- T — 2,2-Dibromopropane
- V — Tetrabromomethane
- W — 1,2,3-Tribromomethane
- X — 1,3-Butanedione, 1-Phenyl
- Y — Benzaldehyde, 3,4-Dimethoxy
- Z — 2,4,Imidazolidinedione, 1-(hydroxymethyl)-5,5-Dimethyl
- AA — 1-Ethyl-2-Methyl Benzene
- BB — 1,2-Benzenediacrylic acid, bis(2-methoxy ethyl ) ester

**CAL Analysis:**

- 1 — Nonane
- 2 — Decane
- 3 — Undecane
- 4 — Cyclotrisiloxane, hexamethyl

**TABLE 5**  
**SUMMARY OF THE LIBRARY SEARCH FOR SOIL SAMPLES**

KING'S LABORATORY, INC.  
 BLYTHEWOOD, SOUTH CAROLINA

Sample ID	Compound Name	RT <sup>1</sup>	Match Quality <sup>2</sup>
CS-02/03	Unknown	3.95	--
	Nonane	35.77	49
	Decane	42.11	91
	Undecane	47.95	94
SS-04	Unknown	3.84	--
	Unknown	3.94	--
	Nonane	35.79	--
	Decane	42.11	87
	Undecane	47.93	91
SS-05	Unknown	3.86	--
	Unknown	3.96	--
	Cyclotrisiloxane, hexamethyl	29.33	64
	Nonane	35.79	62
	Unknown	39.92	--
	Decane	42.14	--
	Undecane	47.95	91
	Unknown	48.31	--
SS-06	Unknown	3.86	--
	Unknown	3.95	--
	Nonane	35.78	50
	Unknown	39.90	--
	Decane	42.12	91
	Undecane	47.95	91
SS-08	Unknown	3.86	--
	Nonane	35.80	72
	Unknown	39.91	--
	Decane	42.12	90
	Undecane	47.94	94
	Unknown	48.30	--
CS-09	Unknown	3.87	--
	Unknown	3.95	--
	Unknown	29.33	--
	Nonane	35.80	47
	Unknown	39.91	--
	Decane	42.14	87
	Undecane	47.94	91

**TABLE 5**  
**SUMMARY OF THE LIBRARY SEARCH FOR SOIL SAMPLES**  
 page 2

Sample ID	Compound Name	RT <sup>1</sup>	Match Quality <sup>2</sup>
SS-10	Unknown	3.86	--
	Unknown	3.95	--
	Nonane	35.79	--
	Unknown	39.86	--
	Decane	42.14	90
	Undecane	47.95	90
	Unknown	48.36	--
	Unknown	53.33	--
SS-11	Unknown	3.87	--
	Nonane	35.80	53
	Decane	42.14	90
	Undecane	47.95	94
	Unknown	48.37	--

Note 1: RT-retention time

Note 2: 100=perfect match; 0=no match

TABLE 6  
SUMMARY OF SEPTIC TANK ANALYSES

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

Sample ID Date Sampled: Laboratory		Office 07/08/91 DHEC	Office 07/08/91 CAL	Lab 07/08/91 DHEC	Lab 07/08/91 CAL
<b>GENERAL:</b>					
pH	SU	—	6.8	—	6.7
Alkalinity	mg/L	—	156	—	73
Total Solids	mg/L	—	379	—	1974
<b>INORGANICS:</b>					
Barium	mg/L	<b>0.065</b>	<0.1	<b>0.047</b>	<0.1
Bicarbonate	mg/L	—	156	—	73
Cadmium	mg/L	<.01	<b>0.0006</b>	<b>0.01</b>	<b>0.0013</b>
Calcium	mg/L	15	9	26	19
Chloride	mg/L	—	36	—	76
Chromium	mg/L	<0.01	<0.05	<b>0.03</b>	<0.05
Copper	mg/L	0.1	0.1	0.12	0.1
Fluoride	mg/L	—	0.2	—	0.2
Iron	mg/L	4.8	3.3	5.4	4.5
Lead	mg/L	<0.05	<0.005	<b>0.05</b>	<b>0.019</b>
Manganese	mg/L	0.26	0.28	0.24	0.31
Magnesium	mg/L	5.1	4	5.6	5
Mercury	mg/L	<b>0.0002</b>	<b>0.0003</b>	<b>0.0033</b>	<b>0.0035</b>
Nickel	mg/L	<0.02	—	<b>0.07</b>	—
Potassium	mg/L	7	10	<6	6
Nitrate	mg/L	—	0.5	—	0.5
Selenium	mg/L	<5	<0.01	<b>0.037</b>	<b>0.048</b>
Sodium	mg/L	14	9	28	20
Sulfate	mg/L	—	42	—	100
Zinc	mg/L	<b>0.94</b>	<b>0.51</b>	<b>0.64</b>	<b>0.43</b>
<b>VOLATILE ORGANICS:</b>					
Chloroform	ug/L	<2	<5	<b>49.9</b>	<100
Methylene Chloride	ug/L	<2	<5	<b>73.7</b>	<b>260</b>
Toluene	ug/L	4.32	<5	<b>35.4</b>	<b>180</b>

CAL Columbia Analytical Labs  
DHEC Department of Health and  
Environmental Control

— Not analyzed  
**BOLD** Detected  
Exceeds Regulatory Level

**TABLE 7**  
**HYDRAULIC CONDUCTIVITY TEST RESULTS**

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

**Hydrocone Hydraulic Conductivity Tests**

Hydrocone Location	Aquifer	Test Type	Hydraulic Conductivity (K)	
			(ft/day)	(cm/sec)
HC-1-33	Middendorf	Hydrocone	5.12E-01	1.81E-04
HC-2-32	Middendorf	Hydrocone	4.94E+00	1.74E-03
HC-3-33	Middendorf	Hydrocone	1.13E-01	3.99E-05
HC-4-16	Middendorf	Hydrocone	2.60E-01	9.17E-05
HC-7-33	Middendorf	Hydrocone	2.20E+00	7.76E-04
HC-8-33	Middendorf	Hydrocone	6.40E-02	2.26E-05
HC-9-28	Middendorf	Hydrocone	8.04E-01	2.84E-04
HC-10-38	Middendorf	Hydrocone	5.51E-01	1.94E-04
HC-11-23	Saprolite	Hydrocone	9.80E-02	3.46E-05
HC-12-32	Middendorf	Hydrocone	9.10E-02	3.21E-05

**Monitoring Well Hydraulic Conductivity Tests**

Well Number	Aquifer	Test Type	Hydraulic Conductivity (K)	
			(ft/day)	(cm/sec)
MW-1	Middendorf	Slug In	4.52E+00	1.59E-03
		Slug Out	4.17E+00	1.47E-03
MW-2	Middendorf	Slug In	2.62E+00	9.24E-04
		Slug Out	1.20E+00	4.23E-04
MW-3	Middendorf	Slug In	1.62E+02	5.72E-02
		Slug Out	8.06E+01	2.84E-02
MW-4	Middendorf	Slug In	1.98E+00	6.99E-04
		Slug Out	2.51E+00	8.85E-04
MW-5	Saprolite	Slug In	1.66E-01	5.86E-05
		Slug Out	1.37E-01	4.83E-05
MW-6	Middendorf	Slug In	4.13E-01	1.46E-04
		Slug Out	1.58E-01	5.57E-05
MW-7	Middendorf	Slug In	5.08E+00	1.79E-03
		Slug Out	6.14E+00	2.17E-03
EDW-1	Saprolite	Slug In	-	-
		Slug Out	3.81E-03	1.34E-06
EDW-2	Saprolite	Slug In	1.27E-01	4.48E-05
		Slug Out	9.80E-02	3.46E-05
EDW-3	Middendorf	Slug In	-	-
		Slug Out	-	-

\*Mean Hydraulic Conductivity (Middendorf) : 1.71E+00 ft/day  
 Mean Hydraulic Conductivity (Saprolite) : 9.15E-02 ft/day

**NOTES:**

- : EDW-1 Slug-In test was not performed (slow response).
- : EDW-3 Slug tests were not performed because of damage to well casing.
- \* : MW-3 Slug test results ignored in mean hydraulic conductivity calculations.

**TABLE 8**  
**SUMMARY OF GROUNDWATER LEVEL DATA**

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

WELL NUMBER	FEET NORTH	FEET EAST	ELEV INNER CASING (ft.msl)	AQUIFER	02/27/86	08/01/86	02/24/87	04/30/87	07/31/87	11/16/87	03/25/88	09/02/88	11/22/88	04/28/89	07/31/89	
					WATER ELEV. (ft. msl)											
MW-1	10346.6	9907.7	537.91	Middendorf	504.8	503.9	506.4	507.9	505.6	503.9	507.3	505.9	506.78	508.8	509.0	
MW-2	10686.1	9921.5	534.85	Middendorf	507.0	506.9	508.2	511.1	509.3	508.4	507.7	505.3	507.37	507.7	508.4	
MW-3	10560.4	10127.0	535.52	Middendorf	503.5	502.6	503.2	507.5	505.0	505.5	506.7	504.5	507.09	507.8	508.0	
MW-4	10685.7	10031.7	533.85	Middendorf	504.6	504.8	507.8	509.6	508.0	507.1	507.6	505.2	505.75	507.8	508.4	
MW-5	10788.8	10099.7	528.65	Saprolite								502.4	505.4	503.95	504.6	505.6
MW-6	10791.4	10058.8	527.11	Middendorf								506.4	504.3	505.32	507.1	507.6
MW-7	10698.9	10136.6	529.50	Middendorf								504.0	504.7	505.86	507.4	507.8
EDW-1	11351.0	10634.9	471.08	Saprolite												
EDW-2	11116.0	9994.3	501.28	Saprolite												
EDW-3	10861.1	9289.8	516.66	Middendorf												
PZ-1-35	10507.1	9804.5	539.17	Middendorf												
PZ-2-27	10619.7	9803.1	537.20	Middendorf												
PZ-2-50	10619.7	9803.1	537.19	Saprolite												

WELL NUMBER	10/27/89	05/23/90	07/31/90	01/31/91	08/15/91	12/16/91	02/17/92	07/24/92	10/23/92	10/26/92	11/30/92				
	WATER ELEV. (ft. msl)														
MW-1	509.4	508.4	506.9	499.9	509.2	507.0	514.2	507.0	506.62	507.0	507.39				
MW-2	508.6	508.2	506.8	507.5	508.9	506.5	505.9	506.7	506.28	507.0	506.91				
MW-3	508.3	507.8	506.3	507.5	508.5	506.2	503.7	506.5	506.26	506.4	506.93				
MW-4	508.9	508.0	506.7	507.3	508.4	506.3	505.8	507.5	506.17	506.4	506.85				
MW-5	503.8	504.0	502.6	502.7	505.4	503.3	503.4	503.1	501.73	504.2	503.72				
MW-6	508.4	505.1	503.6	506.9	508.1	504.5	505.3	505.7	505.69	505.8	506.59				
MW-7	508.5	509.6	508.4	507.1	508.0	505.6	505.4	505.9	505.86	505.9	506.69				
EDW-1									468.93		470.28				
EDW-2									496.16		496.94				
EDW-3											505.71				
PZ-1-35										506.61		506.99			
PZ-2-27										504.91		503.26			
PZ-2-50															

**TABLE 9**  
**GENERAL AND INORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER**

**KING'S LABORATORY, INC.**  
**BLYTHEWOOD, SOUTH CAROLINA**  
**MW-1**

Date Sampled:		07/07/83	08/02/83	01/09/85	08/02/85	02/27/86	08/01/86	02/24/87	04/30/87	07/31/87	11/16/87	03/25/88	09/02/88	11/22/88	04/28/89	07/31/89	10/27/89
Laboratory		Carr	Carr	CAL	Carr	Carr	Carr	CAL									
<b>GENERAL:</b>																	
Temperature	C	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pH	SU	5.4	4.8	4.21	4.7	3.8	4.7	4.6	5.1	5.6	5.0	4.9	4.9	5.0	4.8	6.6	5.0
Alkalinity	mg/L	—	—	—	—	—	—	—	—	—	—	—	<20	—	—	—	—
DOC	mg/L	—	—	9.15	—	—	—	7.0	—	—	—	—	—	—	—	—	—
TOC	mg/L	1.84	2.31	—	4.5	6.0	5.0	—	3.5	3.01	1.34	2.1	< 1.0	< 1.0	28.1	4.0	1.2
TDS	mg/L	21	47	17	8	49	68	22	14	85	23.0	< 2.5	36	28	18	142	20
Specific Conductance	umhos/cm <sup>3</sup>	—	—	19.2	—	—	—	17.2	23	21	17	17	33	23	16	24	32
<b>INORGANICS:</b>																	
Barium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Calcium	mg/L	—	—	—	—	—	—	—	—	—	—	—	0.3	—	—	—	—
Chloride	mg/L	—	—	—	—	—	—	—	—	—	—	—	4.0	3.0	—	—	—
Chromium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	—	<0.05	<0.05	<0.05	<0.05
Cyanide	mg/L	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	0.04	<0.1	<0.10	<0.10	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01
Iron	mg/L	—	—	—	—	—	—	—	—	—	—	—	0.6	—	—	—	—
Lead	mg/L	0.03	0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	—	< 0.05	< 0.05	< 0.05	< 0.05
Magnesium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	0.4	—	—	—
Mercury	mg/L	<0.0005	<0.0005	<0.002	<0.0003	<0.0005	<0.0002	<0.002	0.002	<0.002	<0.002	<0.002	—	<0.002	<0.002	<0.001	<0.001
Potassium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	0.1	—	—	—
Selenium	mg/L	—	—	—	—	—	—	—	—	—	—	—	<0.01	—	—	—	—
Sodium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	1.3	—	—	—
Sulfate	mg/L	—	—	—	—	—	—	—	—	—	—	—	<5	—	—	—	—

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

— Not analyzed

**BOLD** Detected

Exceeds Regulatory Level

TABLE 9  
GENERAL AND INORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER

KINGS LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA  
**MW-1**

Page 2

Date Sampled: Laboratory		02/06/90 CAL	05/23/90 CAL	07/31/90 CAL	01/31/91 CAL	08/15/91 CAL	12/16/91 CAL	02/17/92 CAL	07/24/92 CAL	10/26/92 CAL
<b>GENERAL:</b>										
Temperature	C	-	-	-	-	-	-	-	-	-
pH	SU	5.1	5.2	4.8	6.9	6.5	4.2	4.0	4.2	5.5
Alkalinity	mg/L	-	-	-	-	-	-	-	-	-
DOC	mg/L	-	-	-	-	-	-	-	-	-
TOC	mg/L	2.0	2.4	2.0	3.5	1.1	1.4	<1.0	<1.0	<1.0
TDS	mg/L	14	28	40	39	1.0	9.0	<2.5	26	9
Specific Conductance	umhos/cm <sup>3</sup>	26	19	21	17	20	27	18	28	19
<b>INORGANICS:</b>										
Barium	mg/L	-	-	-	-	-	-	-	-	0.5
Calcium	mg/L	-	-	-	-	-	-	-	-	-
Chloride	mg/L	-	-	-	-	-	-	-	-	-
Chromium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cyanide	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/L	-	-	-	-	-	-	-	-	-
Lead	mg/L	<0.05	<0.05	0.06	0.01	<0.005	0.01	<0.005	<0.005	<0.005
Magnesium	mg/L	-	-	-	-	-	-	-	-	-
Mercury	mg/L	<0.001	<0.001	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	<0.0002
Potassium	mg/L	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	-	-	-	-	-	-	<0.005
Sodium	mg/L	-	-	-	-	-	-	-	-	-
Sulfate	mg/L	-	-	-	-	-	-	-	-	-

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

- Not analyzed

**BOLD** Detected

Exceeds Regulatory Level

TABLE 9  
GENERAL AND INORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA  
MW-2

Page 3

Date Sampled: Laboratory		07/07/83 Carr	08/02/83 Carr	01/09/85 Carr	08/02/85 Carr	02/27/86 Carr	08/01/86 Carr	02/24/87 CAL	04/30/87 CAL	07/31/87 CAL	11/16/87 CAL	03/25/88 CAL	09/02/88 CAL	11/22/88 CAL	04/28/89 CAL	07/31/89 CAL	10/27/89 CAL
<b>GENERAL:</b>																	
Temperature	C	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pH	SU	4.5	4.8	4.26	4.7	4.2	5.1	5.3	5.3	5.4	5.2	5.0	4.9	5.7	5.2	5.2	5.4
Alkalinity	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DOC	mg/L	—	—	20.4	—	—	—	71.8	—	—	—	—	—	29	—	—	—
TOC	mg/L	3.53	1.53	—	69.0	85.0	89.0	—	62.6	78.6	93.0	65.4	105	59	48.3	39.6	10.7
TDS	mg/L	130	74	158	205	310	529	318	378	498	697.0	860	862	930	752	934	288
Specific Conductance	umhos/cm <sup>3</sup>	—	—	247	—	—	—	445	610	707	835	1130	1540	1350	800	980	692
<b>INORGANICS:</b>																	
Barium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Calcium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	27	—	—	—
Chloride	mg/L	—	—	—	—	—	—	—	—	—	—	—	344	313	—	—	—
Chromium	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	—	< 0.05	< 0.05	< 0.05	< 0.05
Cyanide	mg/L	< 0.02	< 0.02	0.2	< 0.02	0.1	< 0.02	0.03	< 0.1	< 0.10	< 0.10	0.05	0.05	< 0.01	< 0.05	< 0.01	< 0.01
Iron	mg/L	—	—	—	—	—	—	—	—	—	—	—	38	—	—	—	—
Lead	mg/L	0.09	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	—	< 0.05	< 0.05	< 0.05	< 0.05
Magnesium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	8.4	—	—	—
Mercury	mg/L	< 0.0005	0.0006	0.0023	< 0.0003	< 0.0005	< 0.0002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	—	< 0.002	< 0.002	< 0.001	< 0.001
Potassium	mg/L	—	—	—	—	—	—	—	—	—	—	—	12	—	—	—	—
Selenium	mg/L	—	—	—	—	—	—	—	—	—	—	—	0.012	—	—	—	—
Sodium	mg/L	—	—	—	—	—	—	—	—	—	—	—	160	—	—	—	—
Sulfate	mg/L	—	—	—	—	—	—	—	—	—	—	—	91	—	—	—	—

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

— Not analyzed

**BOLD** Detected

Exceeds Regulatory Level

TABLE 9  
GENERAL AND INORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA  
MW-2

Page 4

Date Sampled: Laboratory		02/06/90 CAL	05/23/90 CAL	07/31/90 CAL	01/31/91 CAL	08/15/91 CAL	12/16/91 CAL	02/17/92 CAL	07/24/92 CAL	10/26/92 CAL
<b>GENERAL:</b>										
Temperature	C	-	-	-	-	-	-	-	-	-
pH	SU	5.5	5.1	4.8	5.2	5.5	4.9	4.6	4.3	5.5
Alkalinity	mg/L	-	-	-	-	-	-	-	-	-
DOC	mg/L	-	-	-	-	-	-	-	-	-
TOC	mg/L	9	4.8	7.9	<1.0	6.4	6.3	13	7.7	12
TDS	mg/L	748	420	850	993	455	827	1245	998	2096
Specific Conductance	umhos/cm <sup>3</sup>	1050	587	1295	1210	710	991	1953	1280	1935
<b>INORGANICS:</b>										
Barium	mg/L	-	-	-	-	-	-	-	-	0.5
Calcium	mg/L	-	-	-	-	-	-	-	-	-
Chloride	mg/L	-	-	-	-	-	-	-	-	-
Chromium	mg/L	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cyanide	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/L	-	-	-	-	-	-	-	-	-
Lead	mg/L	<0.05	<0.05	<0.05	<0.005	0.037	<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	-	-	-	-	-	-	-	-	-
Mercury	mg/L	<0.001	<0.001	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	0.0042
Potassium	mg/L	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	-	-	-	-	-	-	0.065
Sodium	mg/L	-	-	-	-	-	-	-	-	-
Sulfate	mg/L	-	-	-	-	-	-	-	-	-

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

- Not analyzed

**BOLD** Detected

Exceeds Regulatory Level

**TABLE 9**  
**GENERAL AND INORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER**

**KING'S LABORATORY, INC.**  
**BLYTHEWOOD, SOUTH CAROLINA**  
**MW-3**

Page 5

Date Sampled: Laboratory	07/07/83 Carr	08/02/83 Carr	01/09/85 CAL	08/02/85 Carr	02/27/86 Carr	08/01/86 Carr	02/24/87 CAL	04/30/87 CAL	07/31/87 CAL	11/16/87 CAL	03/25/88 CAL	09/02/88 CAL	11/22/88 CAL	04/28/89 CAL	07/31/89 CAL	10/27/89 CAL
<b>GENERAL:</b>																
Temperature	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
pH	SU	4.7	4.2	4.13	3.7	4.6	5.0	4.7	5.2	5.2	4.7	4.5	4.6	4.8	4.6	
Alkalinity	mg/L	-	-	-	-	-	-	-	-	-	-	<20	-	-	5.2	
DOC	mg/L	-	-	10.2	-	-	-	-	11.0	-	-	-	-	-	-	
TOC	mg/L	2.52	1.37	-	3.0	3.5	9.5	-	2.3	2.16	2.37	2.7	< 1	1	1	
TDS	mg/L	8	22	54	22	62	119	56	48	90	1864.0	22	14	54	1.8	
Specific Conductance	umhos/cm <sup>3</sup>	-	-	70.2	-	-	-	35.6	60	100	46	57	110	83	32	
<b>INORGANICS:</b>																
Barium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Calcium	mg/L	-	-	-	-	-	-	-	-	-	-	-	1.4	-	-	
Chloride	mg/L	-	-	-	-	-	-	-	-	-	-	-	8	8	-	
Chromium	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	
Cyanide	mg/L	< 0.02	< 0.02	< 0.1	< 0.02	< 0.02	< 0.02	0.03	< 0.1	< 0.10	< 0.10	< 0.01	< 0.01	< 0.01	< 0.05	
Iron	mg/L	-	-	-	-	-	-	-	-	-	-	-	< 0.01	< 0.05	< 0.01	
Lead	mg/L	0.06	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.1	-	-	
Magnesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	< 0.05	< 0.05	< 0.05	
Mercury	mg/L	<0.0005	<0.0005	0.0023	<0.00003	<0.0005	<0.0002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	-	1.5	-	-
Potassium	mg/L	-	-	-	-	-	-	-	-	-	-	-	< 0.002	< 0.002	< 0.001	
Selenium	mg/L	-	-	-	-	-	-	-	-	-	-	-	0.9	-	-	
Sodium	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.01	-	-	
Sulfate	mg/L	-	-	-	-	-	-	-	-	-	-	-	2.9	-	-	
		-	-	-	-	-	-	-	-	-	-	-	<5	-	-	

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control  
EMC Environmental Management Corporation  
ECS ECS/Normandeau Associates

- Not analyzed

**BOLD** Detected

 Exceeds Regulatory Level

TABLE 9  
GENERAL AND INORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA  
MW-3

Page 6

Date Sampled: Laboratory		02/06/90 CAL	05/23/90 CAL	07/31/90 CAL	01/31/91 CAL	08/15/91 CAL	12/16/91 CAL	02/17/92 CAL	07/24/92 CAL	10/26/92 CAL
<b>GENERAL:</b>										
Temperature	C	—	—	—	—	—	—	—	—	—
pH	SU	4.9	5.0	4.7	5.7	5.8	4.4	4.0	3.6	5.3
Alkalinity	mg/L	—	—	—	—	—	—	—	—	—
DOC	mg/L	—	—	—	—	—	—	—	—	—
TOC	mg/L	2.5	2.1	2.8	15	1.9	1.9	1.4	2	<1.0
TDS	mg/L	126	168	68	110	42	48	51	72	604
Specific Conductance	umhos/cm <sup>3</sup>	226	179	119	110	120	91	75	92	100
<b>INORGANICS:</b>										
Barium	mg/L	—	—	—	—	—	—	—	—	0.1
Calcium	mg/L	—	—	—	—	—	—	—	—	—
Chloride	mg/L	—	—	—	—	—	—	—	—	—
Chromium	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Cyanide	mg/L	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Iron	mg/L	—	—	—	—	—	—	—	—	—
Lead	mg/L	< 0.05	< 0.05	< 0.05	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium	mg/L	—	—	—	—	—	—	—	—	—
Mercury	mg/L	< 0.001	< 0.001	0.0002	0.0078	< 0.0002	< 0.0002	< 0.0002	0.0005	0.0035
Potassium	mg/L	—	—	—	—	—	—	—	—	—
Selenium	mg/L	—	—	—	—	—	—	—	—	< 0.005
Sodium	mg/L	—	—	—	—	—	—	—	—	—
Sulfate	mg/L	—	—	—	—	—	—	—	—	—

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

— Not analyzed

**BOLD** Detected

Exceeds Regulatory Level

**TABLE 9**  
**GENERAL AND INORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER**

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA  
MW-4

Page 7

Date Sampled: Laboratory		11/01/84 CAL	01/09/85 CAL	04/23/85 Carr	04/23/85 CAL	08/02/85 Carr	02/27/86 Carr	08/01/86 Carr	02/24/87 Carr	04/30/87 CAL	07/31/87 CAL	11/16/87 CAL	03/25/88 CAL	09/02/88 CAL	11/22/88 CAL	04/28/89 CAL	07/31/89 CAL
DUP																	
<b>GENERAL:</b>																	
Temperature	C	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
pH	SU	4.2	2.65	—	—	3.9	3.8	3.6	3.7	4.6	4.1	4.4	3.9	3.9	4.2	4.8	5.1
Alkalinity	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
DOC	mg/L	131	49.6	135	131	—	—	—	121	—	—	—	—	—	—	—	
TOC	mg/L	—	—	—	—	82.0	142.4	105.0	—	136	138	146.0	138	179	184	124.5	
TDS	mg/L	1948	785	1807	2374	752	1555	1676	1360	1896	1498	41.0	516	832	772	968	
Specific Conductance	umhos/cm <sup>3</sup>	—	1659	—	—	—	—	—	1862	2256	1913	2050	1864	1470	1560	1332	
<b>INORGANICS:</b>																	
Barium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Calcium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	4.7	—	
Chloride	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	295	333	—	
Chromium	mg/L	0.06	1.50	0.27	0.268	0.37	0.07	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Cyanide	mg/L	1.2	0.3	< 0.02	0.09	0.49	0.22	< 0.02	0.03	< 0.1	< 0.12	< 0.10	0.1	0.03	< 0.01	0.13	0.01
Iron	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	11	—	
Lead	mg/L	< 0.05	< 0.05	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Magnesium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	7.9	—	
Mercury	mg/L	0.0013	0.0166	< 0.0005	< .002	> 0.023	0.00169	> .0096	< 0.002	< 0.003	0.003	0.007	—	< 0.002	0.005	< 0.001	
Potassium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	13	—	—	
Selenium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	0.024	—	—	
Sodium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	150	—	—	
Sulfate	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	188	—	—	

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

— Not analyzed

**BOLD** Detected

Exceeds Regulatory Level

**TABLE 9**  
**GENERAL AND INORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER**

**KING'S LABORATORY, INC.**  
**BLYTHEWOOD, SOUTH CAROLINA**  
**MW-4**

Page 8

Date Sampled: Laboratory		07/31/89 CAL	10/27/89 CAL	02/06/90 CAL	05/23/90 CAL	07/31/90 CAL	01/31/91 CAL	08/15/91 CAL	12/16/91 CAL	02/17/92 CAL	07/24/92 CAL	10/26/92 CAL
<b>GENERAL:</b>	DUP											
Temperature	C	-	-	-	-	-	-	-	-	-	-	-
pH	SU	5.2	5.2	5	4.9	4.8	4.8	5.9	4.6	4.4	4.3	4.5
Alkalinity	mg/L	-	-	-	-	-	-	-	-	-	-	-
DOC	mg/L	-	-	-	-	-	-	-	-	-	-	-
TOC	mg/L	98.5	101	206	137	116	4.6	98	72	63	<1.0	88
TDS	mg/L	1292	640	906	1202	1352	1320	1238	1458	1550	1749	1818
Specific Conductance	umhos/cm <sup>3</sup>	1490	1634	1318	1327	1930	1888	1820	1520	2620	2580	2770
<b>INORGANICS:</b>												
Barium	mg/L	-	-	-	-	-	-	-	-	-	-	0.3
Calcium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/L	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	< 0.05	< 0.05	0.07	0.07	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07	0.05
Cyanide	mg/L	0.01	< 0.01	< 0.01	0.02	0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Iron	mg/L	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	< 0.05	< 0.05	< 0.05	0.05	< 0.05	0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	< 0.001	< 0.001	< 0.001	0.0066	0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Potassium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	-	-	-	-	-	-	-	-	0.036
Sodium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Sulfate	mg/L	-	-	-	-	-	-	-	-	-	-	-

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

- Not analyzed

**BOLD** Detected

 Exceeds Regulatory Level

**TABLE 9**  
**GENERAL AND INORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER**

**KING'S LABORATORY, INC.**  
**BLYTHEWOOD, SOUTH CAROLINA**  
**MW-S**

Page 9

Date Sampled: Laboratory		03/25/88 CAL	09/02/88 CAL	11/22/88 CAL	04/28/89 CAL	04/28/89 CAL	07/31/89 CAL	10/27/89 CAL	02/06/90 CAL	05/23/90 CAL	07/31/90 CAL	01/31/91 CAL	08/15/91 CAL	12/16/91 CAL	02/17/92 CAL	07/24/92 CAL	10/26/92 CAL
<b>GENERAL:</b>																	
DUP																	
Temperature	C	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pH	SU	6.0	4.9	4.4	4.5	4.5	5.4	5.1	4.9	4.7	4.5	4.9	5.2	4.3	3.8	4.1	4.9
Alkalinity	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DOC	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TOC	mg/L	1.1	1.0	<1.0	3	2.8	2	<1	4.3	6.3	9.3	96	<1.0	1.9	6.5	<1.0	<1.0
TDS	mg/L	84	10	52	44	44	94	28	54	118	132	52	3	30	21	283	59
Specific Conductance	umhos/cm <sup>3</sup>	120	49	82	62	62	35	30	95	130	154	36	100	55	48	332	75
<b>INORGANICS:</b>																	
Barium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.3
Calcium	mg/L	—	—	1.7	—	—	—	—	—	—	—	—	—	—	—	—	—
Chloride	mg/L	—	4.0	15	—	—	—	—	—	—	—	—	—	—	—	—	—
Chromium	mg/L	< 0.05	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06
Cyanide	mg/L	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Iron	mg/L	—	—	< 0.1	—	—	—	—	—	—	—	—	—	—	—	—	—
Lead	mg/L	< 0.05	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.005	0.016	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium	mg/L	—	—	1.5	—	—	—	—	—	—	—	—	—	—	—	—	—
Mercury	mg/L	< 0.002	—	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.0006	0.0019	< 0.0002	< 0.0002	< 0.0002	0.0003	< 0.0002
Potassium	mg/L	—	—	0.4	—	—	—	—	—	—	—	—	—	—	—	—	—
Selenium	mg/L	—	—	< 0.01	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005
Sodium	mg/L	—	—	3.3	—	—	—	—	—	—	—	—	—	—	—	—	—
Sulfate	mg/L	—	—	<5	—	—	—	—	—	—	—	—	—	—	—	—	—

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

— Not analyzed

**BOLD** Detected

 Exceeds Regulatory Level

TABLE 9  
GENERAL AND INORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA  
MW-6

Page 10

Date Sampled: Laboratory		03/25/88 CAL	09/02/88 CAL	11/22/88 CAL	04/28/89 CAL	07/31/89 CAL	10/27/89 CAL	02/06/90 CAL	05/23/90 CAL	07/31/90 CAL	01/31/91 CAL	08/15/91 CAL	12/16/91 CAL	02/17/92 CAL	07/24/92 CAL	10/26/92 CAL
<b>GENERAL:</b>																
Temperature	C	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pH	SU	4.6	5.7	5.4	5.4	5	4.8	5	5.3	5.1	5.2	5.1	4.4	4.3	4.7	4.7
Alkalinity	mg/L	—	—	23	—	—	—	—	—	—	—	—	—	—	—	—
DOC	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TOC	mg/L	42.2	56	56	75.6	93.8	113	102	7.6	7.1	<1.0	<1.0	72	58	68	<1.0
TDS	mg/L	644	502	398	572	970	616	830	384	290	991	804	698	610	704	1311
Specific Conductance	umhos/cm <sup>3</sup>	805	1070	949	920	1170	1596	1258	501	440	1227	1150	887	1080	955	1238
<b>INORGANICS:</b>																
Barium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.2
Calcium	mg/L	—	—	6	—	—	—	—	—	—	—	—	—	—	—	—
Chloride	mg/L	—	206	209	—	—	—	—	—	—	—	—	—	—	—	—
Chromium	mg/L	< 0.05	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Cyanide	mg/L	< 0.01	0.03	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Iron	mg/L	—	—	25	—	—	—	—	—	—	—	—	—	—	—	—
Lead	mg/L	< 0.05	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.014	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium	mg/L	—	—	6.2	—	—	—	—	—	—	—	—	—	—	—	—
Mercury	mg/L	< 0.002	—	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.0006	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0003	0.0002
Potassium	mg/L	—	—	11	—	—	—	—	—	—	—	—	—	—	—	—
Selenium	mg/L	—	—	< 0.01	—	—	—	—	—	—	—	—	—	—	—	0.022
Sodium	mg/L	—	—	83	—	—	—	—	—	—	—	—	—	—	—	—
Sulfate	mg/L	—	—	< 5	—	—	—	—	—	—	—	—	—	—	—	—

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

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 Exceeds Regulatory Level

TABLE 9  
GENERAL AND INORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA  
MW-7

Page 11

Date Sampled: Laboratory		03/25/88 CAL	09/02/88 CAL	11/22/88 CAL	04/28/89 CAL	07/31/89 CAL	10/27/89 CAL	02/06/90 CAL	05/23/90 CAL	07/31/90 CAL	01/31/91 CAL	08/15/91 CAL	12/16/91 CAL	02/17/92 CAL	07/24/92 CAL	10/26/92 CAL
<b>GENERAL:</b>																
Temperature	C	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pH	SU	4.4	4.9	5.6	5.5	5.5	5.1	5.4	4.5	4.7	4.6	5.9	4.9	4.6	4.4	4.5
Alkalinity	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DOC	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TOC	mg/L	5.7	6.0	4	18.3	5.9	8.3	16	95	84	40	88	4.9	3.8	1.7	6.5
TDS	mg/L	234	248	242	366	414	92	432	918	732	1045	291	215	245	305	444
Specific Conductance	umhos/cm <sup>3</sup>	293	455	470	589	490	550	735	1092	1209	1315	550	394	488	488	760
<b>INORGANICS:</b>																
Barium	mg/L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.2
Calcium	mg/L	—	—	6	—	—	—	—	—	—	—	—	—	—	—	—
Chloride	mg/L	—	89	83	—	—	—	—	—	—	—	—	—	—	—	—
Chromium	mg/L	< 0.05	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Cyanide	mg/L	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	0.013	< 0.01	0.02	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Iron	mg/L	—	—	5.3	—	—	—	—	—	—	—	—	—	—	—	—
Lead	mg/L	< 0.05	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.005	0.009	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium	mg/L	—	—	5.9	—	—	—	—	—	—	—	—	—	—	—	—
Mercury	mg/L	< 0.002	—	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Potassium	mg/L	—	—	8	—	—	—	—	—	—	—	—	—	—	—	—
Selenium	mg/L	—	—	< 0.01	—	—	—	—	—	—	—	—	—	—	—	0.005
Sodium	mg/L	—	—	35	—	—	—	—	—	—	—	—	—	—	—	—
Sulfate	mg/L	—	—	8	—	—	—	—	—	—	—	—	—	—	—	—

CAL Columbia Analytical Lab

Carr Carr Lab

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EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

— Not analyzed

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Exceeds Regulatory Level

**TABLE 9**  
**GENERAL AND INORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER**

**KING'S LABORATORY, INC.**  
**BLYTHEWOOD, SOUTH CAROLINA**

Page 12

Sample ID Date Sampled: Laboratory	EDW-1		EDW-2		EDW-3		PW-1					PW-2		CHURCH
	04/27/89 CAL	10/23/92 CAL	04/27/89 CAL	10/23/92 CAL	04/27/89 CAL	11/30/92 CAL	08/20/82 Carr	08/23/82 Carr	08/25/82 Carr	11/23/88 CAL	10/23/92 CAL	11/23/88 CAL	12/02/92 CAL	09/13/91 DHEC
<b>GENERAL:</b>														
Temperature	C	16.6	18	15.5	18	16	-	-	-	-	-	18	-	-
pH	SU	6.4	6.9	6	6.1	5.8	-	6.9	6.8	6.9	5.2	7	5.6	-
Alkalinity	mg/L	48	-	<20	-	<20	-	-	-	-	43	-	45	-
DOC	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
TOC	mg/L	5.9	-	1.5	-	1.8	-	-	-	-	2	-	<1	-
TDS	mg/L	-	-	-	-	-	70	70	74	80	-	109	-	-
Specific Conductance	umhos/cm <sup>3</sup>	101	85	41	24	32	34	-	-	-	115	109	109	105
<b>INORGANICS:</b>														
Barium	mg/L	-	0.3	-	<0.1	-	0.1	-	-	-	<0.1	-	<0.1	<0.05
Calcium	mg/L	11	-	0.9	-	0.8	-	-	-	5.4	-	5.3	-	-
Chloride	mg/L	4	-	3	-	3	-	-	-	2	-	2	-	-
Chromium	mg/L	-	< 0.05	-	< 0.05	-	<0.05	-	0.014	-	<0.05	< 0.05	<0.05	<0.05
Cyanide	mg/L	-	< 0.01	-	< 0.01	-	<0.01	-	-	-	< 0.01	< 0.01	< 0.01	< 0.01
Iron	mg/L	0.48	-	0.12	-	< 0.05	-	0.58	0.62	0.7	0.8	-	0.75	-
Lead	mg/L	-	< 0.005	-	< 0.005	-	< 0.005	-	< 0.01	-	< 0.05	< 0.005	< 0.005	< 0.005
Magnesium	mg/L	3.1	-	0.11	-	0.14	-	-	-	-	5.5	-	5.4	-
Mercury	mg/L	-	0.0003	-	< 0.0002	-	< 0.0002	-	-	-	< 0.002	0.0015	< 0.002	< 0.0002
Potassium	mg/L	1.1	-	2.5	-	0.9	-	-	-	-	0.3	-	0.3	-
Selenium	mg/L	-	< 0.005	-	< 0.005	-	< 0.005	-	-	-	< 0.01	< 0.005	< 0.01	< 0.005
Sodium	mg/L	2.9	-	3.3	-	2.8	-	-	-	-	4.7	-	4.8	-
Sulfate	mg/L	12	-	<5	-	<5	-	-	-	-	5	-	<5	-

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

- Not analyzed

**BOLD** Detected

Exceeds Regulatory Level

TABLE 10  
ORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

Sample ID Date Sampled: Laboratory	MW-1			MW-2			MW-3			MW-4					
	09/02/88 CAL	11/22/88 CAL	10/26/92 CAL	08/02/83 Carr	09/02/88 CAL	11/22/88 CAL	10/26/92 CAL	09/02/88 CAL	11/22/88 CAL	10/26/92 CAL	03/25/88 CAL	09/02/88 CAL	11/22/88 CAL	10/26/92 CAL	
	<b>VOLATILE ORGANICS:</b>														
Acetone	ug/L	-	-	<50	<100	-	-	17.5	-	-	<50	-	-	-	8450
Benzene	ug/L	-	<5	<5	<10	382	160	10.9	-	<5	<5	600	780	451	<500
Bromoform	ug/L	-	<10	<5	<10	-	<10	9.9	-	<10	<5	<10	137	192	<500
Carbon Tetrachloride	ug/L	-	<10	<5	<10	<10	<10	11.8	-	<10	31	<10	<10	<10	<500
Chlorobenzene	ug/L	-	<10	<5	<10	<10	<10	6.1	-	<10	<5	<10	24	30	<500
Chloroform	ug/L	-	<10	<5	699	436	442	52.4	-	<10	7	1900	1880	542	1250
Dichlorobenzene, 1,2-	ug/L	-	<10	<5	-	<10	174	-	-	<10	<5	-	<10	812	<500
Dichlorobenzene, 1,3-	ug/L	-	<10	<5	-	345	<10	-	-	<10	<5	<10	250	11	<500
Dichlorobenzene, 1,4-	ug/L	-	<10	<5	-	<10	36	-	-	<10	<5	-	<10	151	<500
Dichloroethane, 1,1-	ug/L	-	<10	<5	<10	-	<10	<2	-	<10	<5	-	20	<10	<500
Dichloroethane, 1,2-	ug/L	-	<10	<5	<10	-	<10	<2	-	<10	<5	<10	<10	45	<500
Ethylbenzene	ug/L	-	<10	<5	<10	-	<10	<2	-	<10	<5	-	-	<10	<500
Methylene Chloride	ug/L	-	<10	<5	<10	3320	5800	3570	-	<10	<5	16800	2400	12000	4280
Tetrachloroethylene	ug/L	-	<10	<5	<10	<10	<10	<2	-	<10	<5	<10	<10	<10	<500
Toluene	ug/L	-	<10	<5	<10	701	464	14.8	-	<10	<5	450	1350	549	<500
Trichloroethane, 1,1,1-	ug/L	-	<10	<5	-	-	17	5.2	-	<10	<5	<10	16	<10	<500
Trichloroethane, 1,1,2-	ug/L	-	<10	<5	-	-	15	10.6	-	<10	<5	<10	<10	<10	<500
Trichloroethylene	ug/L	-	<10	<5	<10	12100	1080	1610	-	<10	<5	2840	15700	<10	2350
m-Xylene	ug/L	-	-	<5	-	-	<10	<4	-	-	<5	-	-	-	<1000
o-Xylene	ug/L	-	-	<5	-	-	<10	<4	-	-	<5	-	-	-	<1000
<b>SEMI-VOLATILE ORGANICS:</b>															
o-Cresol	ug/L	-	-	<10	-	-	-	22.6	-	-	<10	-	-	-	<10
N-Nitrosodiphenylamine	ug/L	-	<10	-	-	-	<10	-	-	<10	-	<10	-	16	-
Naphthalene	ug/L	-	<10	<5	-	-	34	-	-	<10	<5	13	-	29	-
Nitrobenzene	ug/L	-	<10	-	-	-	<10	-	-	<10	-	-	-	<10	-
Pentachlorophenol	ug/L	-	<10	<10	-	31	156	22.9	-	<10	<10	39	269	92	119
Phenol	ug/L	<0.1	<10	<10	-	349	143	10.5	<0.1	<10	<10	35	378	64	115
Tetrachlorophenol, 2,3,4,6-	ug/L	-	-	<10	-	-	-	<10	-	-	<10	-	-	-	32.6

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

- Not analyzed

**BOLD** Detected

Exceeds Regulatory Level

**TABLE 10**  
**ORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER**

**KING'S LABORATORY, INC.**  
**BLYTHEWOOD, SOUTH CAROLINA**

Page 2

Sample ID Date Sampled: Laboratory		MW-5					MW-6			MW-7		
		09/02/88 CAL	11/22/88 CAL	04/28/89 CAL	04/28/89 CAL	10/26/92 CAL	09/02/88 CAL	11/22/88 CAL	10/26/92 CAL	09/02/88 CAL	11/22/88 CAL	10/26/92 CAL
		DUP										
<b>VOLATILE ORGANICS:</b>												
Acetone	ug/L	-	-	-	-	74	-	-	<5000	-	-	545
Benzene	ug/L	-	<5	17	19	10	390	291	<500	15.0	94	<50
Bromoform	ug/L	-	<10	<2	<2	<5	<10	<10	<500	<10	<10	121
Carbon Tetrachloride	ug/L	-	<10	<2	<2	<5	<10	<10	<500	<10	<10	<50
Chlorobenzene	ug/L	-	<10	<2	<2	<5	<10	<10	<500	<10	<10	<50
Chloroform	ug/L	-	219	303	229	157	758	775	<500	650	835	296
Dichlorobenzene, 1,2-	ug/L	-	11	18	19	10	<10	505	<500	50.0	315	147
Dichlorobenzene, 1,3-	ug/L	-	<10	<2	<2	<5	717	<10	<500	<10	<10	<50
Dichlorobenzene, 1,4-	ug/L	-	<10	-	-	<5	<10	56	<500	<10	34	<50
Dichloroethane, 1,1-	ug/L	-	<10	<2	<2	<5	-	<10	<500	-	<10	<50
Dichloroethane, 1,2-	ug/L	-	33	33	37	<5	<10	61	<500	<10	58	<50
Ethylbenzene	ug/L	-	<10	<2	<2	<5	-	<10	<500	-	<10	<50
Methylene Chloride	ug/L	-	<10	42	50	76	707	917	4280	47.0	357	575
Tetrachloroethene	ug/L	-	<10	<2	<2	<5	<10	146	<500	<10	<10	<50
Toluene	ug/L	-	<10	<2	3	8	334	394	<500	<10	32	<50
Trichloroethane, 1,1,1-	ug/L	-	<10	<2	<2	<5	<10	<10	<500	<10	<10	53
Trichloroethane, 1,1,2-	ug/L	-	<10	<2	<2	<5	<10	<10	<500	<10	<10	<50
Trichloroethene	ug/L	-	<10	20	20	86	1960	1245	3315	2780	750	1881
m-Xylene	ug/L	-	-	-	-	<5	-	-	<500	-	-	<50
o-Xylene	ug/L	-	-	-	-	<5	-	-	<500	-	-	<50
<b>SEMI-VOLATILE ORGANICS:</b>												
o-Cresol	ug/L	-	-	<30	<30	<10	-	-	16.9	-	-	<10
N-Nitrosodiphenylamine	ug/L	-	<10	-	-	-	-	46	-	-	12	-
Naphthalene	ug/L	-	<10	-	-	<5	-	26	<500	-	<10	<50
Nitrobenzene	ug/L	-	48	-	-	-	-	<10	-	-	<10	-
Pentachlorophenol	ug/L	-	<10	<10	<10	<10	88	64	122	<10	<10	28
Phenol	ug/L	<0.1	<10	<10	<10	<10	1200	<10	620	12.0	<10	<10
Tetrachlorophenol, 2,3,4,6-	ug/L	-	-	-	-	<10	-	-	23	-	-	<10

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

- Not analyzed

**BOLD** Detected

Exceeds Regulatory Level

TABLE 10  
ORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

Page 3

Sample ID Date Sampled: Laboratory	EDW-1		EDW-2			EDW-3		PW-1			PW-2		
	04/27/89 10/23/92		04/27/89 10/13/92 10/23/92			04/27/89 11/30/92		08/02/85 11/23/88 10/23/92		11/23/88 12/02/92			
	ECS	CAL	ECS	EMC	CAL	ECS	CAL	Carr	CAL	CAL	CAL	CAL	
<b>VOLATILE ORGANICS:</b>													
Acetone	ug/L	-	<50	-	-	<50	-	<50	<0.1	-	<50	-	<50
Benzene	ug/L	<5	<5	<5	0	<5	<5	<5	<4.4	<5	<5	<5	<5
Bromoform	ug/L	<5	<5	<5	-	<5	<5	<5	<4.7	<10	<5	<10	<5
Carbon Tetrachloride	ug/L	<5	<5	<5	-	<5	<5	<5	<2.8	<10	<5	<10	<5
Chlorobenzene	ug/L	<5	<5	<5	0	<5	<5	<5	<6.0	<10	<5	<10	<5
Chloroform	ug/L	<5	<5	<5	0	<5	<5	<5	<1.6	<10	<5	<10	<5
Dichlorobenzene, 1,2-	ug/L	<5	<5	<5	-	<5	<5	<5	-	<10	<5	<10	<5
Dichlorobenzene, 1,3-	ug/L	<5	<5	<5	0	<5	<5	<5	-	<10	<5	<10	<5
Dichlorobenzene, 1,4-	ug/L	<5	<5	<5	0	<5	<5	<5	-	<10	<5	<10	<5
Dichloroethane, 1,1-	ug/L	<5	<5	<5	0	<5	<5	<5	<4.7	<10	<5	<10	<5
Dichloroethane, 1,2-	ug/L	<5	<5	<5	0	<5	<5	<5	-	<10	<5	<10	<5
Ethylbenzene	ug/L	<5	<5	<5	0	<5	<5	<5	<7.2	<10	<5	<10	<5
Methylene Chloride	ug/L	-	<5	-	0	<5	-	<5	<2.8	<10	<5	<10	<5
Tetrachloroethene	ug/L	<5	<5	<5	0	<5	<5	<5	<4.1	<10	<5	<10	<5
Toluene	ug/L	<5	<5	<5	0	<5	<5	<5	<6.0	<10	<5	<10	<5
Trichloroethane, 1,1,1-	ug/L	<5	<5	<5	0	<5	<5	<5	<3.8	<10	<5	<10	<5
Trichloroethane, 1,1,2-	ug/L	<5	<5	<5	0	<5	<5	<5	<5.0	<10	<5	<10	<5
Trichloroethylene	ug/L	<5	<5	<5	0	<5	<5	<5	<1.9	<10	<5	<10	<5
m-Xylene	ug/L	<5	<5	<5	0	<5	<5	<5	-	-	<5	<10	<5
o-Xylene	ug/L	<5	<5	<5	0	<5	<5	<5	-	-	<5	<10	<5
<b>SEMI-VOLATILE ORGANICS:</b>													
o-Cresol	ug/L	-	<10	-	-	<10	-	<10	-	-	<10	-	<10
N-Nitrosodiphenylamine	ug/L	-	-	-	-	-	-	-	<10	-	<10	<10	-
Naphthalene	ug/L	-	-	-	-	-	-	-	<10	-	<10	<10	-
Nitrobenzene	ug/L	-	-	-	-	-	-	-	<10	-	<5	<10	-
Pentachlorophenol	ug/L	-	<10	-	-	<10	-	<10	-	<10	-	<10	-
Phenol	ug/L	-	<10	-	-	<10	-	<10	-	<10	<10	<10	<10
Tetrachlorophenol, 2,3,4,6-	ug/L	-	<10	-	-	<10	-	<10	-	-	<10	-	<10

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

- Not analyzed

**BOLD** Detected

Exceeds Regulatory Level

TABLE 10  
ORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

Page 4

Sample ID	HC-1-33	HC-2-32	HC-2-52	HC-3-33	HC-4-16	HC-4-26	HC-6-23	HC-7-33	HC-8-33	HC-9-28
	10/14/92 EMC	10/15/92 EMC	10/17/92 EMC	10/15/92 EMC	10/13/92 EMC	10/13/92 EMC	10/16/92 EMC	10/16/92 CAL	10/15/92 EMC	10/15/92 EMC
<b>VOLATILE ORGANICS:</b>										
Acetone	ug/L		-	-	-	-	-	<500	-	-
Benzene	ug/L		<b>29</b>	0	0	7	<b>130</b>	<b>818</b>	<b>367</b>	0
Bromoform	ug/L		-	-	-	-	-	<50	-	-
Carbon Tetrachloride	ug/L		-	-	-	-	-	<50	-	-
Chlorobenzene	ug/L		0	0	0	0	0	<50	0	0
Chloroform	ug/L		0	0	0	0	0	<b>798</b>	0	0
Dichlorobenzene, 1,2-	ug/L		-	-	-	-	-	<b>365</b>	-	-
Dichlorobenzene, 1,3-	ug/L		-	-	-	-	-	<50	-	-
Dichlorobenzene, 1,4-	ug/L		-	-	-	-	-	<50	-	-
Dichloroethane, 1,1-	ug/L		0	0	0	0	0	<50	0	0
Dichloroethane, 1,2-	ug/L		0	0	0	0	0	<50	0	0
Ethylbenzene	ug/L		0	0	0	0	17	8	<50	7
Methylene Chloride	ug/L		0	0	0	0	0	<b>127</b>	0	0
Tetrachloroethene	ug/L		<b>138</b>	0	0	0	0	<50	0	0
Toluene	ug/L		<b>93</b>	0	0	0	<b>289</b>	<b>161</b>	<b>98</b>	0
Trichloroethane, 1,1,1-	ug/L		0	0	0	0	0	53	0	0
Trichloroethane, 1,1,2-	ug/L		0	0	0	0	0	<50	0	0
Trichloroethene	ug/L		<b>419</b>	0	0	<b>8</b>	<b>26</b>	<b>1400</b>	<b>268</b>	<b>211</b>
m-Xylene	ug/L		71	<b>5 J</b>	0	0	2 J	0	<50	0
o-Xylene	ug/L		61	2 J	0	11	2 J	6	<50	0
<b>SEMI-VOLATILE ORGANICS:</b>										
o-Cresol	ug/L		-	-	-	-	-	-	-	-
N-Nitrosodiphenylamine	ug/L		-	-	-	-	-	-	-	-
Naphthalene	ug/L		-	-	-	-	-	-	-	-
Nitrobenzene	ug/L		-	-	-	-	-	-	-	-
Pentachlorophenol	ug/L		-	-	-	-	-	-	-	-
Phenol	ug/L		-	-	-	-	-	-	-	-
Tetrachlorophenol, 2,3,4,6-	ug/L		-	-	-	-	-	-	-	-

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

- Not analyzed

**BOLD** Detected

Exceeds Regulatory Level

TABLE 10  
ORGANIC ANALYSIS SUMMARIES FOR GROUNDWATER

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

Page 5

Sample ID Date Sampled: Laboratory	HC-10-38		HC-11-23		HC-12-32	
	10/16/92 EMC	10/16/92 CAL	10/17/92 EMC	10/17/92 CAL	10/17/92 EMC	10/17/92 CAL
	<b>VOLATILE ORGANICS:</b>					
Acetone ug/L	-	<50	-	<50	-	<50
Benzene ug/L	0	<5	0	<5	0	<5
Bromoform ug/L	-	<5	-	<5	-	<5
Carbon Tetrachloride ug/L	-	<5	-	31	-	<5
Chlorobenzene ug/L	0	<5	0	<5	0	<5
Chloroform ug/L	0	<5	0	<5	0	<5
Dichlorobenzene, 1,2- ug/L	-	<5	-	<5	-	<5
Dichlorobenzene, 1,3- ug/L	-	<5	-	<5	-	<5
Dichlorobenzene, 1,4- ug/L	-	<5	-	<5	-	<5
Dichloroethane, 1,1- ug/L	0	<5	0	<5	0	<5
Dichloroethane, 1,2- ug/L	0	<5	0	<5	0	<5
Ethylbenzene ug/L	2.1	<5	0	<5	0	<5
Methylene Chloride ug/L	0	<5	0	<5	0	<5
Tetrachloroethene ug/L	0	<5	0	<5	0	<5
Toluene ug/L	0	<5	0	<5	0	<5
Trichloroethane, 1,1,1- ug/L	0	<5	0	<5	0	<5
Trichloroethane, 1,1,2- ug/L	0	<5	0	<5	0	<5
Trichloroethene ug/L	0	<5	0	<5	0	<5
m-Xylene ug/L	0	<5	0	<5	0	<5
o-Xylene ug/L	0	<5	0	<5	0	<5
<b>SEMI-VOLATILE ORGANICS:</b>						
o-Cresol ug/L	-	-	-	-	-	-
N-Nitrosodiphenylamine ug/L	-	-	-	-	-	-
Naphthalene ug/L	-	-	-	-	-	-
Nitrobenzene ug/L	-	-	-	-	-	-
Pentachlorophenol ug/L	-	-	-	-	-	-
Phenol ug/L	-	-	-	-	-	-
Tetrachlorophenol, 2,3,4,6- ug/L	-	-	-	-	-	-

CAL Columbia Analytical Lab

Carr Carr Lab

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

- Not analyzed

**BOLD** Detected

Exceeds Regulatory Level

TABLE 11  
RELATIVE MOBILITY OF ORGANIC COMPOUNDS DETECTED IN GROUNDWATER

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

Compound Name	Assumed Kd <sup>1</sup>	Mobility Class <sup>1</sup>	Trends in Wells <sup>2</sup>			
			MW-2	MW-4	MW-5	MW-6
(ml/g)						
Acetone	.003	very high				
Benzyl Alcohol	.04	very high				
Aniline	.04	very high				
Methylene Chloride	.08	very high	-	-	+	+
Phenol	.09	very high	-	-		
Chloroform	.11	very high	-	-	-	-
1,2 - Dichloroethane	.12	very high				
1,1,2 - Trichloroethane	.16	very high	-			
Benzene	.32	high	-	-	-	
Trichloroethene	.50	moderate	-	-	+	+
1,1,1 - Trichloroethane	.51	moderate	-			+
Carbon Tetrachloride	.77	moderate				
Toluene	.80	moderate	-	-		
Tetrachloroethene	1.0	moderate				
Chlorobenzene	1.1	moderate				
1,2 - Dichlorobenzene	1.1	moderate				
1,3 - Dichlorobenzene	1.5	moderate				
Xylenes	1.2-1.9	moderate				
1,4 - Dichlorobenzene	2.0	low				
Ethylbenzene	2.1	low				
Pentachlorophenol	3.0	low				+
N-nitrosodiphenylamine	3.2	low				
Naphthalene	4.3	low				

Notes:

- As reported on pages 4-8 in the Cost of Remedial Action (CORA) Model Users Manual, by CH2M Hill for USEPA.
- "-" denotes falling trend, "+" denotes rising trend for period of record for each well.

TABLE 12  
SUMMARY OF SURFACE WATER ANALYSES

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

		VARIOUS NAMES FOR THE SPRING TO THE NORTH OF THE KLI PROPERTY														
Sample ID	Date Sampled: Laboratory	EIDOLON							EIDOLON							
		SPRING	BOG	BOG	BOG	BOG	BOG	BOG	BOG	SEEP 1	SEEP 1	SPRING	SW-2			
		07/07/83 Carr	08/23/83 Carr	09/15/83 Carr	10/15/84 CAL	01/09/85 CAL	04/23/85 Carr	04/24/85 CAL	08/02/85 Carr	11/16/87 CAL	11/22/88 CAL	04/27/89 CAL	09/13/91 DHEC	10/23/92 CAL		
<b>GENERAL:</b>																
Temperature	C	-	-	-	-	-	-	-	-	-	-	-	-	-	19	
pH	SU	6.4	5	7.1	6.2	4.27	-	4.8	4.3	3.5	5.6	4.2	-	-	4.1	
Alkalinity	mg/L	-	-	-	-	-	-	-	-	<20	<20	-	-	-	-	
DOC	mg/L	-	-	-	21.1	22.3	31	39.3	-	-	-	-	-	-	-	
TOC	mg/L	0.8	61	12	-	-	-	-	18	14	<1	5.2	-	-	-	
TDS	mg/L	34	1778	171	195	122	257	272	2369	310	30	-	-	-	-	
Specific Conductance	umhos/cm <sup>3</sup>	-	-	-	-	115	-	-	-	260	25	400	-	-	223	
<b>INORGANICS:</b>																
Arsenic	mg/L	-	-	-	-	-	-	-	-	-	-	-	0.026	-	-	
Barium	mg/L	-	-	-	-	-	-	-	-	-	-	-	2	0.1	-	
Cadmium	mg/L	-	-	-	-	-	-	-	-	<0.01	-	-	0.01	-	-	
Calcium	mg/L	-	-	-	-	-	-	-	-	-	1.1	10	-	-	-	
Chloride	mg/L	-	-	-	-	-	-	-	-	-	3	89	-	-	-	
Chromium	mg/L	<0.01	0.58	0.42	0.14	<0.01	0.37	<0.01	<0.01	<0.05	<0.05	-	0.02	<0.05	-	
Cyanide	mg/L	<0.02	<0.1	-	<0.5	0.1	<0.02	0.03	<0.02	<0.10	<0.01	-	0.02	<0.01	-	
Iron	mg/L	-	-	-	-	-	-	-	-	-	<0.1	1.5	-	-	-	
Lead	mg/L	0.06	0.22	<0.01	<0.05	<0.05	<0.01	<0.05	0.06	<0.05	<0.05	-	0.54	0.01	-	
Magnesium	mg/L	-	-	-	-	-	-	-	-	-	0.3	3.9	-	-	-	
Mercury	mg/L	<0.0005	<0.0005	0.00077	0.0016	0.0026	0.0011	<0.002	<0.0003	<0.002	<0.002	-	<0.0002	<0.0002	-	-
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	0.21	-	-	
Potassium	mg/L	-	-	-	-	-	-	-	-	-	0.1	1.6	-	-	-	
Selenium	mg/L	-	-	-	-	-	-	-	-	<0.01	-	0.077	<0.005	-	-	
Silver	mg/L	-	-	-	-	-	-	-	-	-	-	0.05	-	-	-	
Sodium	mg/L	-	-	-	-	-	-	-	-	-	1	36	-	-	-	
Sulfate	mg/L	-	-	-	-	-	-	-	-	<5	10	-	-	-	-	

CAL Columbia Analytical Lab

Carr Carr Lab

- Not analyzed

**BOLD** Detected

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

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TABLE 12  
SUMMARY OF SURFACE WATER ANALYSES

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

Page 2

		SANDY LEVEL CHURCH SPRING									
Sample ID	Date Sampled:	EAST BOG		CHURCH SEEP 2		SEEP 2 SPRING		SW-1 Carr	SW-3 CAL	DHEC	
		11/03/83	11/22/88	04/27/89	09/13/91	DHEC				2 CAL	SW-7 DHEC
<b>GENERAL:</b>											
Temperature	C	—	—	—	—	—	20	—	20	—	18
pH	SU	3.1	4.6	4.4	—	—	4.4	—	4.3	—	6.1
Alkalinity	mg/L	—	<20	<20	—	—	—	—	—	—	—
DOC	mg/L	—	—	—	—	—	—	—	—	—	—
TOC	mg/L	16	6	7.3	—	—	—	—	—	—	—
TDS	mg/L	—	380	—	—	—	—	—	—	—	—
Specific Conductance	umhos/cm <sup>3</sup>	—	800	112	—	213	—	146	—	—	24
<b>INORGANICS:</b>											
Arsenic	mg/L	—	—	—	<.005	—	—	—	—	—	—
Barium	mg/L	—	—	—	<0.05	0.2	—	0.2	—	—	0.1
Cadmium	mg/L	—	<0.01	—	<0.01	—	—	—	—	—	—
Calcium	mg/L	—	11	1.5	—	—	—	—	—	—	—
Chloride	mg/L	—	173	20	—	—	—	—	—	—	—
Chromium	mg/L	0.15	<0.05	—	<0.01	<0.05	—	<0.05	—	<0.05	—
Cyanide	mg/L	<0.02	<0.01	—	<0.01	<0.01	—	<0.01	—	<0.01	—
Iron	mg/L	—	2.1	0.21	—	—	—	—	—	—	—
Lead	mg/L	0.01	<0.05	—	<0.05	0.015	—	0.005	—	<0.005	—
Magnesium	mg/L	—	6.7	1.2	—	—	—	—	—	—	—
Mercury	mg/L	0.001	<0.002	—	<0.0002	0.0014	—	0.0012	—	<0.0002	—
Nickel	mg/L	—	—	—	<0.02	—	—	—	—	—	—
Potassium	mg/L	—	4	0.7	—	—	—	—	—	—	—
Selenium	mg/L	—	<0.01	—	<0.005	<0.005	—	<0.005	—	<0.005	—
Silver	mg/L	—	—	—	<0.03	—	—	—	—	—	—
Sodium	mg/L	—	63	9.4	—	—	—	—	—	—	—
Sulfate	mg/L	—	19	7	—	—	—	—	—	—	—

CAL Columbia Analytical Lab

Carr Carr Lab

— Not analyzed

**BOLD** Detected

DHEC Department of Health and Environmental Control

EMC Environmental Management Corporation

ECS ECS/Normandeau Associates

TABLE 12  
SUMMARY OF SURFACE WATER ANALYSES

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

Page 3

Sample ID  Date Sampled: Laboratory	SPRING NORTH OF KLI					CHURCH SPRING							
	EIDOLON					CHURCH							
	BOG 08/23/83 Cart	SEEP 1 11/22/88 CAL	SPRING 09/13/91 DHEC	SW-2 10/23/92 CAL	SW-2 10/16/92 EMC	SEEP 2 11/22/88 CAL	SPRING 09/13/91 DHEC	SW-1 10/23/92 CAL	SW-1 10/16/92 EMC	SW-3 10/23/92 CAL	DHEC 2 02/10/92 DHEC	SW-7 10/27/92 CAL	
<b>VOLATILE ORGANICS:</b>													
Acetone	ug/L	-	-	-	<50	-	-	-	<50	-	<50	-	<50
Aniline	ug/L	-	-	8.82	-	-	-	<4	-	-	-	-	-
Benzene	ug/L	-	<5	6.76	<5	0	<5	<2	<5	0	<5	<2	<5
Bromoform	ug/L	-	<10	<2	<5	-	<10	<2	<5	-	<5	<2	<5
Carbon Tetrachloride	ug/L	-	<10	<2	<5	-	<10	<2	<5	-	<5	<2	<5
Chlorobenzene	ug/L	-	<10	5.58	<5	0	<10	<2	<5	0	<5	<2	<5
Chloroform	ug/L	10	<10	6.49	<5	0	15	<2	<5	0	<5	<2	<5
Dichlorobenzene, 1,2-	ug/L	-	<10	22.9	<5	-	<10	<2	<5	-	<5	6.22	<5
Dichlorobenzene, 1,3-	ug/L	-	<10	<2	<5	-	<10	<2	<5	-	<5	<2	<5
Dichlorobenzene, 1,4-	ug/L	-	<10	5.41	<5	-	<10	<2	<5	-	<5	<2	<5
Dichloroethane, 1,1-	ug/L	-	<10	<2	<5	-	<10	<2	<5	-	<5	<2	<5
Dichloroethane, 1,2-	ug/L	-	<10	2.36	<5	-	<10	<2	<5	-	<5	<2	<5
Ethylbenzene	ug/L	-	<10	<2	<5	0	<10	<2	<5	0	<5	<2	<5
Methylene Chloride	ug/L	-	<10	<2	<5	0	<10	<2	<5	0	<5	<2	<5
Tetrachloroethene	ug/L	-	<10	<2	<5	0	<10	<2	<5	0	<5	<2	<5
Toluene	ug/L	-	<10	70.2	<5	0	<10	<2	<5	0	<5	<2	<5
Trichloroethane, 1,1,1-	ug/L	-	<10	<2	<5	0	<10	<2	<5	0	<5	<2	<5
Trichloroethane, 1,1,2-	ug/L	-	<10	<2	<5	0	<10	<2	<5	0	<5	-	<5
Trichloroethene	ug/L	-	<10	17.7	<5	0	38	<2	<5	2 J	<5	-	<5
m-Xylene	ug/L	-	-	-	<5	0	-	-	<5	0	<5	-	<5
o-Xylene	ug/L	-	-	-	<5	5 J	-	-	<5	0	<5	-	<5
<b>SEMI-VOLATILE ORGANICS:</b>													
Butylbenzyl Phthalate	ug/L	-	<10	28.8	-	-	<10	<4	-	-	-	-	-
o-Cresol	ug/L	-	-	-	<10	-	-	-	<10	-	<10	-	<10
Di-N-Butylphthalate	ug/L	-	<10	167	-	-	<10	<2	-	-	-	-	-
N-Nitrosodiphenylamine	ug/L	-	<10	<4	-	-	<10	<4	-	-	-	-	-
Naphthalene	ug/L	-	<10	<4	<5	-	<10	<4	<5	-	<5	-	<5
Nitrobenzene	ug/L	-	<10	<4	-	-	<10	<4	-	-	-	-	-
Pentachlorophenol	ug/L	-	<10	<4	<10	-	<10	<4	<10	-	<10	-	<10
Phenol	ug/L	-	<10	<4	<10	-	<10	<4	<10	-	<10	-	<10
Tetrachlorophenol, 2,3,4,6-	ug/L	-	-	-	<10	-	-	-	<10	-	<10	-	<10

TABLE 13  
MODELING INPUT PARAMETERS

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

AQUIFER	MIDDENDORF								SAPROLITE							
SCENARIO No.	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
<b>PARAMETER:</b>																
No. Wells	1	2	3	3	3	1	3	3	1	2	3	3	3	1	3	3
On/Off-site	On	On	On	On	On/Off	Off	Off	Off	On	On	On	On	On/Off	Off	Off	Off
Well radius	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Time	years	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Transmissivity	ft <sup>2</sup> /day	20.52	20.52	20.52	20.52	20.52	20.52	20.52	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
Saturated Thickness	ft	12	12	12	12	12	12	12	70	70	70	70	70	70	70	70
Hydraulic Gradient		0.0026	0.0026	0.0026	0.0026	0.0053	0.0053	0.0053	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
Porosity		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Angle of Flow	degrees	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Pumping Rate	ft <sup>3</sup> /day	125	96	64	64	64	125	64	381	190	130	130	130	381	130	130

TABLE 14  
SUMMARY OF MODELING RESULTS

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

AQUIFER	MIDDENDORF								SAPROLITE							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
No. of Wells On/Off—site	1 On	2 On	3 On	3 On	3 On/Off	1 Off	3 Off	3 Off	1 On	2 On	3 On	3 On	3 On/Off	1 Off	3 Off	3 Off
<b>Capture Zone:</b>																
3 years:																
Length (ft)	265	350	430	450	430	260	270	390	140	170	*	270 **	290 **	145	90	230
Width (ft)	265	330	260	240	290	260	380	280	145	120	*	90 **	90 **	145	220	100
6 years:																
Length (ft)	380	480	550	560	570	385	420	530	210	230	*	330 **	330 **	210	160	290
Width (ft)	375	465	360	400	390	360	510	410	205	200	*	135 **	130 **	200	270	150
9 years:																
Length (ft)	470	585	650	665	670	475	540	640	245	270	*	390	390	255	200	330
Width (ft)	410	565	510	480	470	440	600	500	250	250	*	190	150	250	320	200
12 years:																
Length (ft)	540	680	740	750	770	550	640	730	300	320	*	400	410	300	240	360
Width (ft)	515	650	620	605	540	505	660	600	290	290	*	200	190	290	350	240
15 years:																
Length (ft)	610	755	820	830	860	620	740	820	325	350	*	450	450	340	280	400
Width (ft)	590	725	690	700	640	550	730	690	320	330	*	240	220	325	380	280

**Note:**

Capture zone length is measured in the direction of flow, and the width is measured perpendicular to the direction of flow.

Plume length: 800 ft

Plume width: 400 ft

\* Capture zones are not contiguous for all time periods.

\*\* Capture zones not contiguous for 3 and 6 year time periods.

 Included as figures in Plate 2.

**TABLE 15**  
**SURFACE WATER SURVEY, 10/22/92**

**KING'S LABORATORY INC.**  
**BLYTHEWOOD, SOUTH CAROLINA**

Location ID	Temperature (°C)	Specific Conductance (umhos/cm <sup>3</sup> )	Remarks
SW-1	15.3	120	Where new road crosses Church Spring run.
SW-1A	15.5	170	Approximately 50 feet up from SW-1, by upturned tree.
SW-1B	17.2	150	Approximately 100 feet up from SW-1.
SW-1C	17.2	80	At head of Church Spring run, leading to SW-1.
Church Spring	17.2	30	From round Church Spring house.
SW-2	15.5	120	At head of other spring, near EDW-2.
SW-3	17.1	120	Approximately 100 feet down from the confluence of two spring runs.
SW-4	16.7	30	Approximately 50 feet up from confluence, on branch run.
SW-5	16.4	115	Approximately 50 feet up from confluence, on main run.
SW-6	16.5	50	Approximately 100 feet from confluence, on main run.
SW-7	16.7	20	Approximately 100 feet from confluence, on branch run.
SW-8	16.7	40	At head of seep flowing into branch run.
SW-9	17.2	20	Approximately 100 feet up from confluence of seep and branch run.
A	20.6	20	Approximately 50 feet up from confluence toward west pond.
B	19.2	70	Approximately 50 feet up from confluence toward east pond.
Outfall-1	19.4	70	At NPDES outfall on east pond run.
Outfall-2	17.9	20	Up from outfall on east pond run.
Outfall-3	20.4	30	At barbed wire fence, down from outfall on east pond run.

**TABLE 16**  
**Current Land Use**  
**Surface Water Exposure Concentration Summary**

**King's Laboratory, Inc.**  
**Blythewood, South Carolina**

<u>Population/Pathway</u>	<u>Compound</u>	<u>Exposure Concentration</u>
Recreational-Child	Benzene Chromium	0.0067 mg/l 0.580 mg/l
Ingestion of surface water and dermal contact with surface water	Di-N-Butylphthalate Dichlorobenzene-1,2 Mercury Trichloroethene	0.167 mg/l 0.0229 mg/l 0.0026 mg/l 0.017 mg/l

**TABLE 17**  
**Generic Equation for Calculating Chemical Intakes**

**King's Laboratory, Inc.  
Blythewood, South Carolina**

---

$$I = C \times \frac{CR \times EFD}{BW} \times \frac{1}{AT}$$

---

Where:

I = Intake; the amount of chemical at the exchange boundary (mg/kg body weight/day)

Chemical-Related Variable

C = Chemical concentration; the average concentration contacted over the exposure period (e.g., mg/liter water)

Variables that describe the exposed population

CR = Contact rate; the amount of contaminated medium contacted per unit time or event (e.g., liters/day)

EFD = Exposure frequency and duration; describes how long and how often exposure occurs. Often calculated using two terms (EF and ED):

    EF = exposure frequency (days/year?)

    ED = exposure duration (years)

BW = Body weight; the average body weight over the exposure period (kg)

Assessment-determined variable

AT = Averaging time; period over which exposure is averaged (days)

---

**TABLE 18**  
**Surface Water Exposure Assessment Summary**  
**Current Land Use**  
**Child Recreational Exposure Scenario**

**King's Laboratory, Inc.**  
**Blythewood, South Carolina**

Chemical of Concern	<u>EXPOSURE PATHWAY AND CHRONIC DAILY INTAKE (mg/kg/day)</u>		Carcin. Effect	Non-Carcinogenic Effect
	<u>DERMAL</u>	<u>INGESTION</u>		
Benzene	4.48E-08	B	6.67E-07	B
Chromium	A	n/a	A	5.76E-04
Di-N-Butylphthalate	A	1.12E-05	A	1.66E-04
Dichlorobenzene 1,2-	A	1.53E-07	A	2.28E-05
Mercury	A	n/a	A	2.58E-06
Trichloroethene	1.14E-07	B	1.69E-06	B

A = CDI for carcinogenic effects not calculated for chemicals not considered by EPA to be potential human carcinogens or for chemicals not considered to exhibit carcinogenic effects by a specific pathway.

B = CDI for non-carcinogenic effects not calculated because it does not have an EPA-verified chronic reference dose.

n/a = CDI not calculated as compound not as expected to be absorbed by dermal route.

**TABLE 19**  
**CANCER RISK ESTIMATE FOR SURFACE WATER**

**CURRENT LAND USE: RECREATIONAL  
 POPULATION: CHILD**

**KING'S LABORATORY, INC.  
 BLYTHEWOOD, SOUTH CAROLINA**

CHEMICAL	CDI (mg/kg/day)	SLOPE FACTOR	CHEMICAL SPECIFIC RISK	TOTAL PATHWAY RISK	TOTAL EXPOSURE RISK
<b>EXPOSURE PATHWAY: DERMAL CONTACT WITH SURFACE WATER</b>					
BENZENE	4.48E-08	2.90E-02	1.30E-09		
TRICHLOROETHENE	1.14E-07	1.70E-02	1.94E-09		
				3.24E-09	
<b>EXPOSURE PATHWAY: INGESTION OF SURFACE WATER</b>					
BENZENE	6.66E-07	2.90E-02	1.93E-08		
TRICHLOROETHENE	1.69E-06	1.70E-02	2.87E-08		
				4.80E-08	
					5.13E-08

CDI REFLECTS A 0.05 LITER SURFACE WATER INTAKE

SW3RIEST.WK3

TABLE 20  
CHRONIC HAZARD INDEX ESTIMATE FOR SURFACE WATER

CURRENT LAND USE: RECREATIONAL  
POPULATION: CHILD

KING'S LABORATORY, INC.  
BLYTHEWOOD, SOUTH CAROLINA

CHEMICAL	CDI (mg/kg/day)	RfD (mg/kg/day)	HAZARD QUOTIENT	PATHWAY HAZARD INDEX	TOTAL EXPOSURE HAZARD INDEX
EXPOSURE PATHWAY: DERMAL CONTACT WITH SURFACE WATER					
DICHLOROBENZENE 1,2	1.53E-07	9.00E-02	1.70E-06		
DI-N-BUTYLPHthalate	1.12E-05	1.00E-01	1.12E-04		
1.14E-04					
EXPOSURE PATHWAY: INGESTION OF SURFACE WATER					
CHROMIUM	5.76E-04	5.00E-03	1.15E-01		
DICHLOROBENZENE 1,2	2.28E-05	9.00E-02	2.53E-04		
DI-N-BUTYLPHthalate	1.66E-04	1.00E-01	1.66E-03		
MERCURY	2.58E-06	3.00E-04	8.60E-03		
1.26E-01					
1.26E-01					

INORGANIC CONSTITUENTS OF SURFACEWATER WERE NOT INCLUDED IN DERMAL PATHWAY  
BENZENE AND TRICHLOROETHENE WERE EXCLUDED FROM THE QUANTITATIVE ASSESSMENT  
OF CHRONIC HAZARD BECAUSE THESE POTENTIAL CARCINOGENS HAVE NO RfDs  
INGESTION PATHWAY CDI REFLECTS A 0.05 LITER SURFACE WATER INTAKE

SW3HIEST.WK3

**TABLE 21**  
**LOCAL WATER SUPPLY WELL INVENTORY**

**KING'S LABORATORY, INC.**  
**BLYTHEWOOD, SOUTH CAROLINA**

Map Number	Well Owner	Use		Depth	Diameter	Casing Depth	Date Drilled	Driller	Yield
		Type <sup>1</sup>	Frequency						
				(ft.)	(in.)	(ft.)	(approx.)		(gpm)
1	Jean Holler	Dom.	Daily						
2	D.A. Swygart	Dom.	Daily	260	6	?	1966	Heater Well	1
3	Sandy Level Church	Inst.	Weekly	300	6	110	1977	Ozwalt	7
4	Masonic Lodge	Inst.	Occasional	110	6	90	1960	?	3
5	Community Center	Inst.	Occasional	120	6	?	< 1970	Branham <sup>3</sup>	
PW-1	King's Laboratory	Comm.	Daily	140	6		< 1970		
PW-2	King's Laboratory	Comm.	Daily	500	6	140	1987	Ozwalt	3
6	J.A. Montgomery <sup>2</sup>	Dom.	Occasional		6		< 1970		

Note 1: Dom.-Domestic  
 Inst.-Institutional  
 Comm.-Commercial

Note 2: Used as rental property.

Note 3: Straightened by Will Coleman approximately 1970 to fit a submersible pump.

**APPENDIX A**  
**SUBSURFACE DATA**

**Appendix A-1 - Boring Logs and Well Construction Details**

**Appendix A-2 - Piezocone Logs**

## WELL NO. PMW-1

ELEVATION FEET	DEPTH (FT.)	SOIL CLASSIFICATION	SAMPLE DEPTH IN FEET	TEST COUNT	MONITORING WELL CROSS SECTION						
					2"	4"					
537.4	Very Loose to Loose Tan Slightly Silty Fine to Medium SAND (SM-SP)		- 2'	4	CAP						
			- 4'	7	CONC. SEAL						
			- 6.5'	8	2" I.D. STAND PIPE						
8	Dense Tan, Grey and White Clayey Fine to Coarse SAND (SC)		- 9'	52	BACKFILL						
			- 14'	34							
15	Dense Tan Slightly Clayey Fine to Coarse SAND (SC-SP)		- 19'	39							
			- 24'	43							
23	Dense Light Tan and White Slightly Silty Clayey Medium to Coarse SAND w/kaolin (moist) (SC-SP)										
GROUND WATER: DEPTH BE LOW GROUND SURFACE: 31 Feet											
DATE DRILLED: 5/24/83											

FOUNDATION & MATERIALS ENGINEERING, INC.  
COLUMBIA, S.C.KING'S LABORATORY INC.  
MONITORING WELL

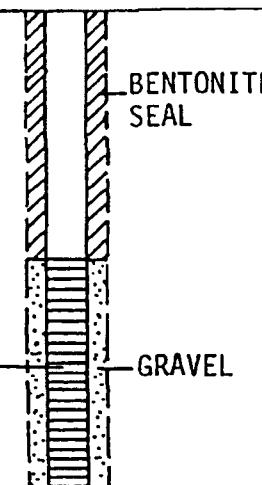
POST, BUCKLEY, SCHUH & JERNIGAN	DWN. BY	AT		SCALE: 1"=4'
	CKD. BY	GP		
	APPR'D.	RSP		

## WELL NO. PMW-1 (cont'd.)

ELEVATION	DEPTH (ft)	SOIL CLASSIFICATION	MONITORING WELL CROSS-SECTION	
			TOP	BOT.
		Dense Light Tan and White Slightly Silty Clayey Medium to Coarse SAND w/kaolin (moist) (SC-SP)	29'	52
32.5		Very Firm Fine to Coarse SAND (SP)	34'	25
36.3		BORING TERMINATED AT 36 FEET		

GROUND WATER:  
DEPTH BELOW GROUND SURFACE: 31 Feet

DATE DRILLED: 5/24/83




FOUNDATION & MATERIALS ENGINEERING, INC.  
COLUMBIA, S.C.

KING'S LABORATORY INC.  
MONITORING WELL

POST, BUCKLEY, SCHUH & JERNIGAN

DWN. BY	AT		SCALE: 1"=1'
CKD. BY	GP		
APPR'D.	RSP		

## WELL NO. PMW-2

ELEVATION FEET	DEPTH (FEET)	SOIL CLASSIFICATION	SAMPLE HT. IN FEET	INCHES	MONITORING WELL CROSS-SECTION	
					CAP	CONC. SEAL
534.1		Very Loose to Dense Tan Slightly Silty Fine to Medium SAND (SM-SP)  (Perched water at 6.5' - 7')	4'	4		
	7	Hard Dark Red and Grey Clayey Fine Sandy Kaolinitic CLAY (CL)	6.5'	35	2" I.D. STAND PIPE	
	9	Dense Red, Grey and White Kaolinitic Clayey Fine to Medium SAND (SC)	9'	30		BACKFILL
	16	Very Firm Tan and White Slightly Clayey Fine to Medium SAND (SC-SP)	14'	38		
	22	Dense Tan and White Clayey Fine to Coarse SAND (SC)	19'	22		
	24	Dense Red and White Slightly Clayey Medium to Coarse SAND (SC-SP)	24'	44		

GROUND WATER:  
DEPTH BELOW GROUND SURFACE: 29.2 Feet

DATE DRILLED: 5/24/83

FOUNDATION & MATERIALS ENGINEERING, INC.  
COLUMBIA, S.C.KING'S LABORATORY, INC.  
MONITORING WELL

POST, BUCKLEY, SCHUH & JERNIGAN	DWN. BY	AT	SCALE: 1"=4'
	CKD. BY	GP	
	APPR'D.	RSP	

## WELL NO. PMW-2 (cont'd.)

ELEVATION	DEPTH (FEET)	SOIL CLASSIFICATION	SAMPLE DEPTH	N(COUNT)	MONITORING WELL CROSS-SECTION
	28.5	Dense Red and White Slightly Clayey Medium to Coarse SAND (SC-SP)			
	31	Dense Light Tan Medium to Coarse SAND (SP)	29'	31	
	33.5	Hard White Fine to Coarse Sandy CLAY (CL)			
	37	Dense Light Tan Medium to Coarse SAND (SP)	34'	38	
		BORING TERMINATED AT 37 FEET			
<b>GROUND WATER:</b> DEPTH BELOW GROUND SURFACE: 29.2 Feet					
DATE DRILLED: 5/24/83					
 FOUNDATION & MATERIALS ENGINEERING, INC. COLUMBIA, S.C.		KING'S LABORATORY, INC. MONITORING WELL			
POST, BUCKLEY, SCHUH & JERNIGAN		DWN. BY	AT		SCALE: 1" = 4'
		CKD. BY	GP		
		APPR'D.	RSP		

## WELL NO. PMW-3

ELEVATION N.G.L.	DEPTH (FT.)	SOIL CLASSIFICATION	SAMPLE DEPTHL	N.COUNT	MONITORING WELL CROSS-SECTION
535.3		Very Loose to Loose Tan Slightly Silty Fine to Medium SAND (SM-SP)	2' 4' 6.5'	4 5 6	CAP CONC. SEAL 2" I.D. STAND PIPE
8.5	10	Hard Red and Grey Fine Sandy Kaolinitic Silty CLAY (CL)	9'	38	BACKFILL
	10	Dense Tan and Grey Slightly Clayey Fine to Coarse SAND (SC-SP)	14'	52	
17		Very Firm Tan and White Slightly Clayey Fine to Coarse SAND (SC-SP)	19'	24	
23		Dense Light Tan Medium to Coarse SAND (SP)	24'	30	BENTONITE SEAL 2" I.D. WELL SCREEN GRAVEL
<b>GROUND WATER:</b>					
<b>DEPTH BELOW GROUND SURFACE:</b> 26.3 Feet					
<b>DATE DRILLED:</b> 5/24/83					

FOUNDATION & MATERIALS ENGINEERING, INC.  
COLUMBIA, S.C.KING'S LABORATORY, INC.  
MONITORING WELL

POST, BUCKLEY, SCHUH & JERNIGAN	DWN. BY	AT	SCALE: 1" = 4'
	CKD. BY	GP	
	APPR'D.	RSP	

## WELL NO. PMW-3 (cont'd.)

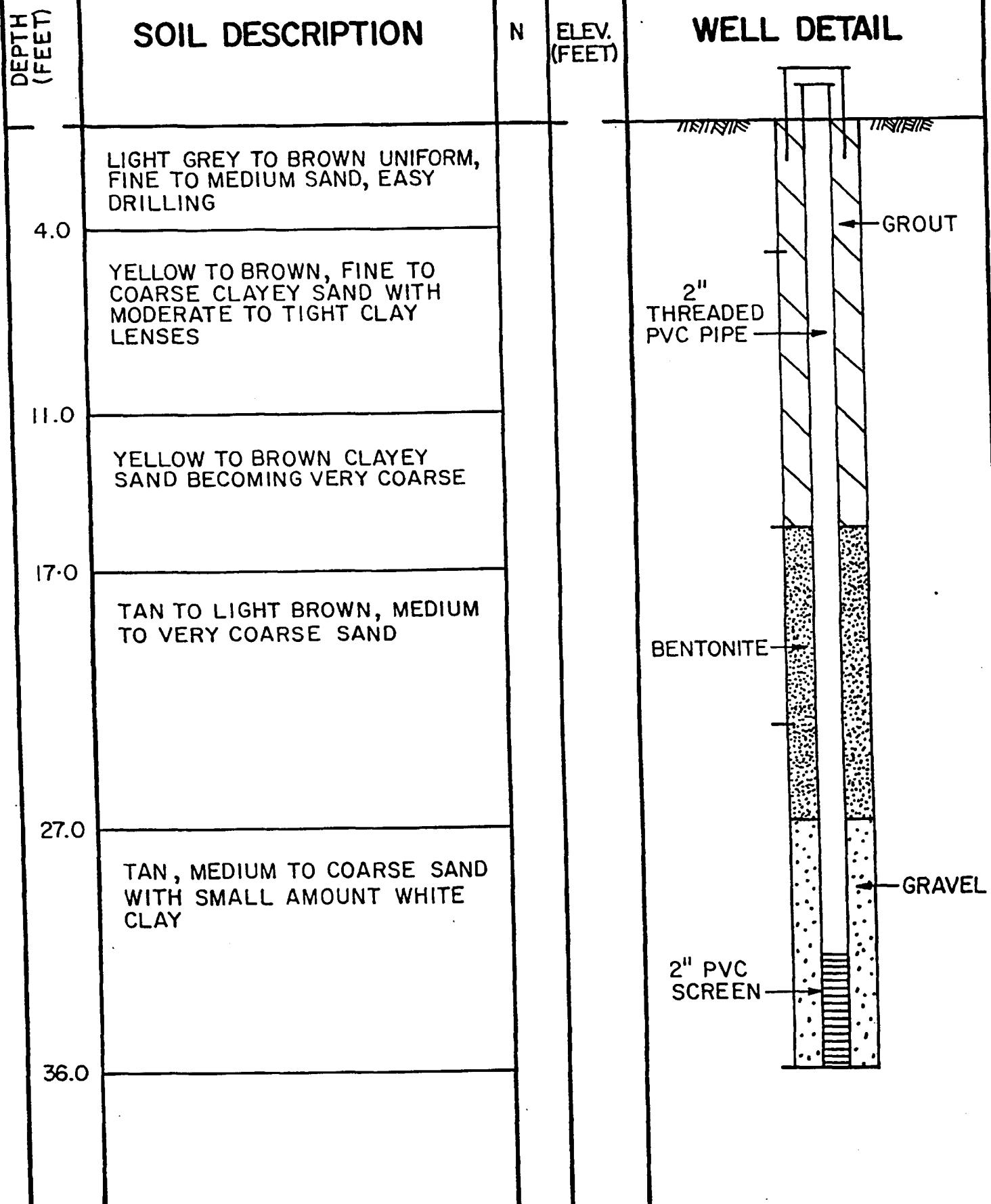
ELEVATION	DEPTH (FEET)	SOIL CLASSIFICATION	SAMPLI- DEPTH	N-COUNT	MONITORING WELL CROSS-SECTION
		Dense Light Tan Medium to Coarse SAND (SP)	29'	51	
32		Dense Slightly Silty Medium to Coarse SAND (SP)	34'	48	
36		BORING TERMINATED AT 36 FEET			
<b>GROUND WATER:</b>					
DEPTH BE LOW GROUND SURFACE: 26.3 Feet					
DATE DRILLED: 5/24/83					



FOUNDATION & MATERIALS ENGINEERING, INC.  
COLUMBIA, S.C.

KING'S LABORATORY INC.  
MONITORING WELL

POST, BUCKLEY, SCHUH & JERNIGAN	DWN. BY	AT	SCALE: 1" = 4'
	CKD. BY	GP	
	APPR'D.	RSP	



POST, BUCKLEY, SCHUH & JERNIGAN, INC.

KING'S LABORATORY

75073

REPRO PRODUCTS INC.

PMW-4

DEPTH (FEET)	SOIL DESCRIPTION	N	ELEV. (FEET)	WELL DETAIL
	SAME AS 6			
5	SAME AS 6			
10	RED TO TAN. MEDIUM GRAINS SAND MIXED WITH GREY CLAY FIRM	46		2" PVC PIPE
	INCREASE IN REDDISH CONTENT	43		4" PVC PIPE
19	TAN TO MEDIUM BROWN CLAYES - SAND, MEDIUM GRAINED LOOSE	83		CEMENT GROUT
24	WHITE MEDIUM TO COARSE GRAINED SAND VERY CLEAN LOOSE	72		BENTONITE CEMENT GROUT
	SLIGHT CLAY CONTENT	72		
34	TAN TO RED LAMINATED SAPROLITE, OCCASIONAL BROWN TO RED IRON WEATHERING, PITTED TO LAMINAR	46		
40				

SEE SHT. 2  
FOR CONTINUATION

N - PENETRATION RESISTANCE IS THE NUMBER  
OF BLOWS OF A 140 lb. HAMMER FALLING  
30 IN. TO DRIVE A 1.4 IN. I.D., 2 IN. O.D.  
SAMPLER 1 FOOT.

CLIENT

PROJECT

KING'S LABORATORY



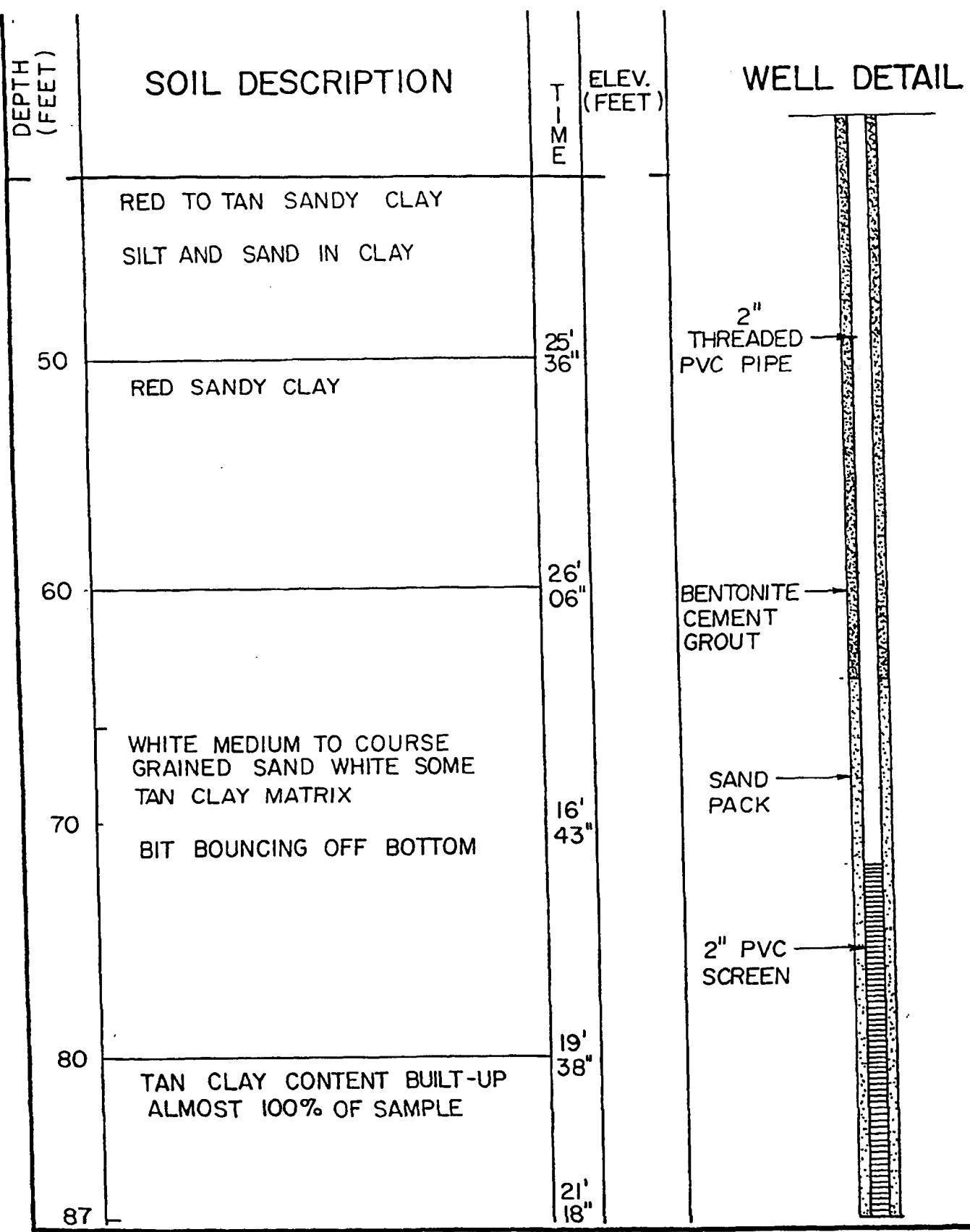
POST, BUCKLEY, SCHUH & JERNIGAN, INC.

MONITORING WELL LOG

WELL NO. PMW-5

DATE DRILLED: 3/21/88

DATE INSTALLED: 3/21/88



N - PENETRATION RESISTANCE IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. TO DRIVE A 1.4 IN. I.D., 2 IN. O.D. SAMPLER 1 FOOT.

CLIENT

PROJECT

KING'S LABORATORY



POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
MONITORING WELL LOG

WELL № PMW-5

DATE DRILLED: 3/21/88

DATE INSTALLED: 3/21/88

DEPTH (FEET)	SOIL DESCRIPTION	N	ELEV. (FEET)	WELL DETAIL
	DARK BROWN MEDIUM-GRAIN-ED SILTY SAND LOOSE TO FIRM			
11.0	LIGHT TAN SANDY CLAY TO SILTY CLAY LOOSE	-8		 THREADED PVC PIPE'. A horizontal line extends from the right side of this pipe section. Below the pipe is a section labeled 'BENTONITE' with a horizontal line extending from its right side. At the bottom of the well bore is a section labeled 'SAND PACK' with a horizontal line extending from its right side. The well bore is surrounded by a stippled area representing soil."/>
10.0	CLAYEY SAND TAN TO BROWN MEDIUM GRAINED LOOSE TO FIRM			
20.0	SAND TAN TO LIGHT BROWN COARSE GRAINED LOOSE			
29.0	SILTY WHITE SAND MEDIUM TO COARSE GRAINED LOOSE	-16		
35.0	CLAYEY WHITE SAND MEDIUM TO COARSE GRAINED LOOSE	-25		
38.5	SAPROLITE, YELLOW TO WHITE WITH SAND TO QUARTZ PEB- BLES, IRON WEATHERING, HIGH CLAY CONTENT FIRM	-34		

N - PENETRATION RESISTANCE IS THE NUMBER OF BLOWS OF A 140 lb. HAMMER FALLING 30 IN. TO DRIVE A 1.4 IN. I.D., 2 IN. O.D. SAMPLER 1 FOOT.

CLIENT

PROJECT

KINGS LABORATORY



POST, BUCKLEY, SCHUH & JERNIGAN, INC.

MONITORING WELL LOG

WELL NO PMW - 6

DATE DRILLED: 3/15/88

DATE INSTALLED: 3/15/88

DEPTH  
(FEET)

SOIL DESCRIPTION

N ELEV.  
(FEET)

WELL DETAIL

MEDIUM BROWN MEDIUM TO COARSE GRAINED SILTY SAND LOOSE

5

11

TAN SILTY CLAY - SANDY CLAY FIRM TO LOOSE

9

26

TAN TO RED MEDIUM GRAINED SANDY CLAY FIRM

25

31

WHITE GREY CLAYEY MEDIUM GRAINED SAND LOOSE - FIRM

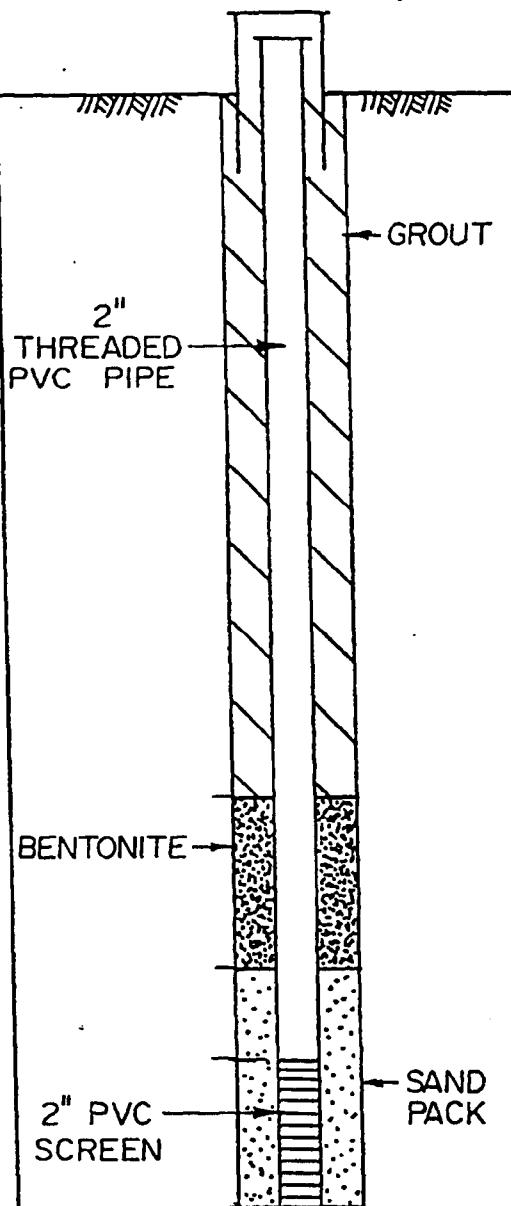
29

45

WHITE MEDIUM TO COARSE GRAINED SAND CLEAN-LOOSE

36

SAPROLITE - WEATHERED IRON STAINED, WHITE CLAY TEXTURED, OCCASIONAL WHITE QUARTZ SAND, AND / OR PEBBLES EXTREMELY FIRM



N - PENETRATION RESISTANCE IS THE NUMBER OF BLOWS OF A 140 lb. HAMMER FALLING 30 IN. TO DRIVE A 1.4 IN. I.D., 2 IN. O.D. SAMPLER 1 FOOT.

CLIENT

PROJECT

KING'S LABORATORY



POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
MONITORING WELL LOG

WELL NO. PMW - 7

DATE DRILLED: 3/15/88

DATE INSTALLED: 3/15/88

## BORING LOG

Depth Blow/ (ft) Foot	Field Organic Vapor (PPM)	USCS	Soil/Rock Classification	Well Construc- tion
4			CL	
5			GRAY-LIGHT GRAY CLAY, MOIST, TRACE FINE GRAINED SAND, ROOTS PRESENT	
9			DARK RED SAPROLITE, MASSIVE, SOFT, FRIABLE, DEEPLY WEATHERED, CHLORITE, CERRUSITE, BIOTITE?, VERTICAL FOLIATIONS	
10				
15			DARK RED SAPROLITE, MASSIVE, SOFT, FRIABLE, DEEPLY WEATHERED, CHLORITE, CERRUSITE, VERTICAL FOLIATIONS, SLIGHTLY MOIST	
16				
20			DARK RED SAPROLITE, MASSIVE, SOFT, FRIABLE, DEEPLY WEATHERED, LARGE CHLORITE, BIOTITE CLASTS, SUB-VERTICAL FOLIATIONS, SLIGHTLY MOIST	
21				

Date Completed APRIL 18, 1989Boring/Well Number EDW-1Well Head Elevation (ft, msl) 471.08Ground Elevation (ft, msl) 469.81Surface Completion Details LOCKING STEEL CAP AND PADCasing Size 2 INCH Casing Material SCH.40 PVC Slot Size 0.01

18-082.02



POST, BUCKLEY, SCHUH &amp; JERNIGAN, INC.

EIDOLON PROPERTY

## BORING LOG

Depth (ft)	Blow/ Foot	Field Organic Vapor (PPM)	USCS	Soil/Rock Classification	Well Construct- tion
4				CL	
5				GRAY-LIGHT GRAY CLAY, MODELED WITH ORANGE RED CLAY, PLASTIC, MOIST, ROOTS PRESENT	
10	27			YELLOW-GRAY SAPROLITE, MASSIVE, SOFT, FRIABLE, DEEPLY WEATHERED, MUSCOVITE, CHLORITE, FELDSPAR	
15				YELLOW SAPROLITE, MASSIVE, SOFT, FRIABLE, DEEPLY WEATHERED, CHLORLITE, FELDSPARS, ANPHIBOLE ? GRAINS	
20			B.T.	YELLOW SAPROLITE, CRUSHED, SOFT- LOW HARDNESS, WEAK, DEEPLY WEATHERED TO COMPETENT ROCK AT 18.7 FEET. BIT REFUSAL @ 18.07	

Date Completed APRIL 18, 1989Boring/Well Number EDW-2Well Head Elevation (ft, msl) 501.28Ground Elevation (ft, msl) 500.07Surface Completion Details LOCKING STEEL CAP AND PADCasing Size 2 INCH Casing Material SCH.40 PVC Slot Size 0.01

18-082.02

309418



POST, BUCKLEY, SCHUH &amp; JERNIGAN, INC.

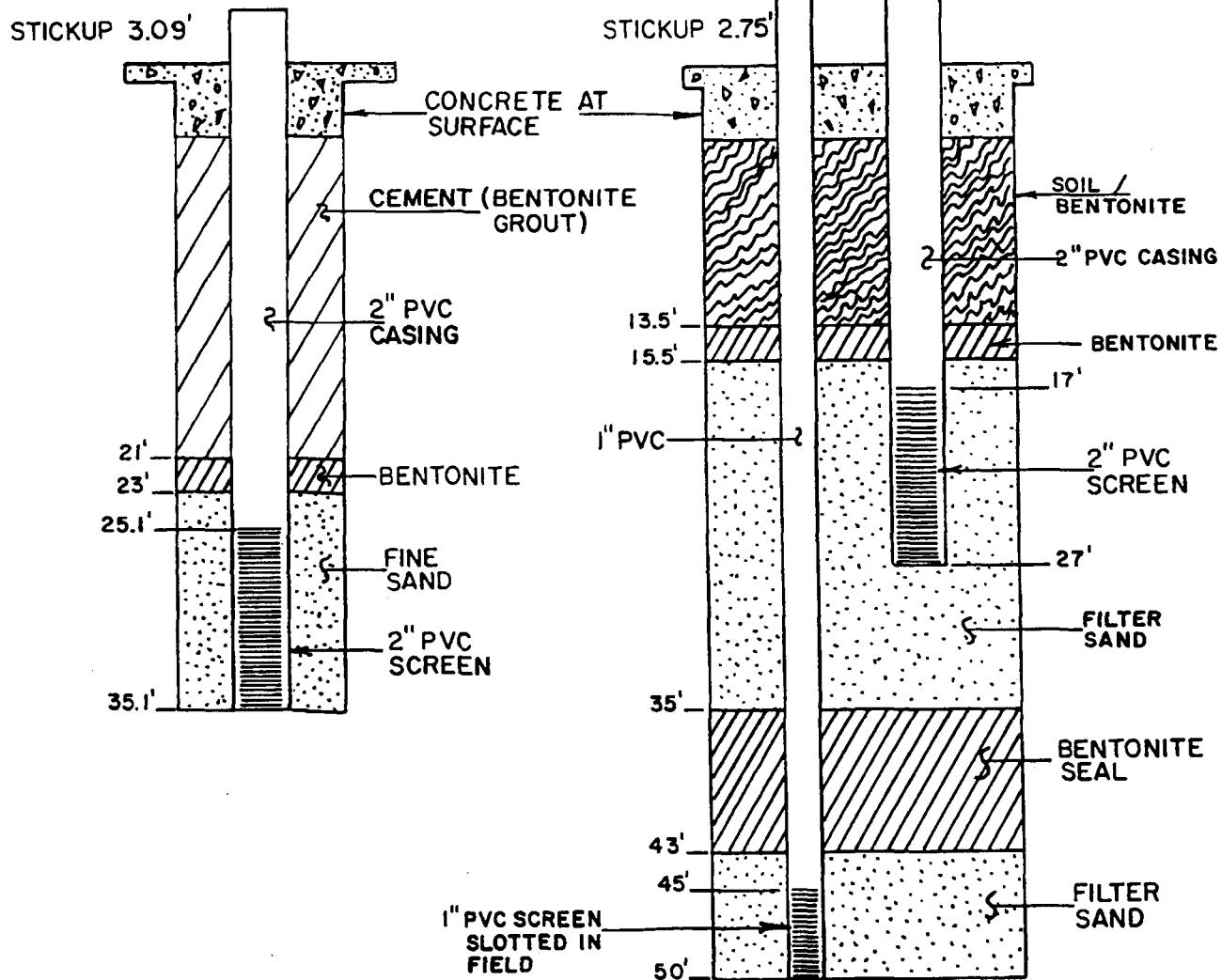
EIDOLON PROPERTY

## BORING LOG

Depth (ft) Foot	Blow/ Field Organic Vapor (PPM)	USCS	Soil/Rock Classification	Well Construc- tion
5			RED CLAYEY SAND (SC) MOIST, LOOSE WITH ANGULAR- SUBANGULAR QUARTZ GRAINS	
9	X			
10	X			
13	X		RED-GRAY CLAYEY SAND (SC), MOIST, LOOSE, MEDIUM GRAINED	
15	X			
17	X			
19	X		YELLOW-RED SLIGHTY CLAYEY SAND, WET, LOOSE MEDIUM- FINE GRAINED	
20	X	X	YELLOW SAPROLITE, MASSIVE, SOFT, FRIABLE, DEEPLY WEATHERED, LARGE RELICT FELDSPAR CRYSTALS, FEW DARK MINERALS	
21	X			
22	X			
23	X			
24	X			
25	X			
26	X			
27	X			
28	X			
29	X			
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PZ-1

PZ-2



### PIEZOMETER DETAIL



POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

PZ-1 / PZ-2



# Environmental Management Corporation

**Corporate Offices**  
**P.O. Box 1195, Black Mountain, North Carolina 28711**  
**Phone (704) 669-2888 : Fax (704) 669-9422**

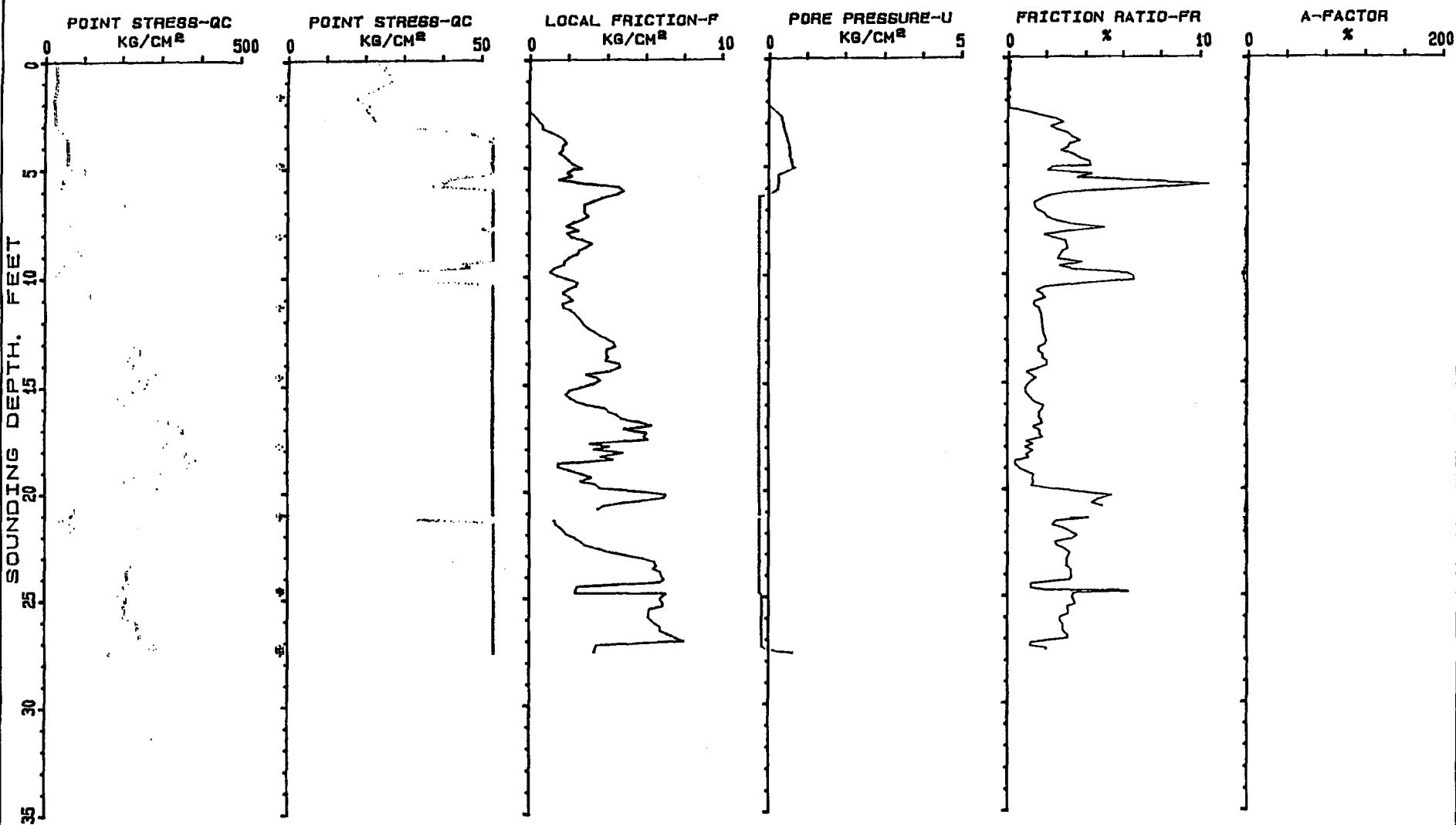
JOB NAME ..... PBS & J

JOB FILE NUMBER... KINGS LAB

CONE SOUNDING.... PC-4

DEPTH FEET	SOIL BEHAVIOR TYPE	QC (KG/CM <sup>2</sup> )	LF (KG/CM <sup>2</sup> )	N N' VALUES	VERTICAL EFFECTIVE STRESS (KG/CM <sup>2</sup> )	RELATIVE DENSITY (%)	FRICTION ANGLE (DEGREES)	YOUNGS MODULUS (KG/CM <sup>2</sup> )	UNDRAINED SHEAR STRENGTH (KG/CM <sup>2</sup> )	SENSITIVITY	COMP.	QC
#	*	**	***									
2	SILTY TO CLAYEY F.S.	25.2	.02	8 5	.048	50%-60%	46-48	55	-	-	-	-
2	SILTY TO CLAYEY F.S.	16.8	.01	6 4	.097	40%-50%	42-44	41	-	-	-	-
2	CLAYEY FINE SAND	32	.58	12 9	.146	50%-60%	44-46	70	-	-	-	-
3	CLAYEY FINE SAND	54.2	1.78	21 18	.195	60%-70%	44-46	119	-	-	-	-
4	CLAYEY FINE SAND	84.4	2.22	33 26	.244	70%-80%	46-48	185	-	-	-	-
6	VERY STIFF FINE GRAINED	101.2	4.19	101 37	.293	-	-	-	6.33	2.4	WD	16
7	SILTY FINE SAND	154.6	2.84	38 42	.341	190%	46-48	340	-	-	-	-
9	SILTY TO CLAYEY F.S.	96.3	2.12	32 28	.39	70%-80%	44-46	211	-	-	-	-
9	CLAYEY FINE SAND	76.9	2.48	30 25	.439	70%-80%	42-44	169	-	-	-	-
10	CLAY	29.6	1.41	29 12	.478	-	-	-	1.83	2.1	WD	6
12	SILTY TO CLAYEY F.S.	114	1.92	38 30	.527	70%-80%	44-46	250	-	-	-	-
12	SILTY FINE SAND	152.3	2.61	38 41	.576	80%-90%	44-46	335	-	-	-	-
13	SILTY FINE SAND	225.2	4.09	56 61	.625	190%	46-48	495	-	-	-	-
13	SILTY FINE SAND	235	4.3	58 64	.673	190%	46-48	517	-	-	-	-
14	SILTY FINE SAND	244.3	3.28	61 62	.722	190%	46-48	537	-	-	-	-
16	SILTY FINE SAND	209.4	3.07	52 54	.771	190%	44-46	460	-	-	-	-
16	SILTY FINE SAND	350	5.74	87 93	.82	190%	46-48	770	-	-	-	-
17	FINE SAND	353.7	3.83	70 86	.874	190%	46-48	778	-	-	-	-
19	FINE SAND	271.2	1.9	54 62	.927	190%	44-46	596	-	-	-	-
20	SILTY TO CLAYEY F.S.	184.1	4.94	61 57	.976	80%-90%	42-44	405	-	-	-	-
21	CLAYEY FINE SAND	65.6	2.04	26 21	1.007	40%-50%	38-40	144	-	-	-	-
23	SILTY TO CLAYEY F.S.	197.4	5.3	65 61	1.038	80%-90%	42-44	434	-	-	-	-
24	SAND TO CLAYEY FINE SAND	208.8	6.81	104 69	1.071	80%-90%	42-44	459	-	-	-	-
24	SAND TO CLAYEY FINE SAND	182.4	6.87	91 64	1.104	70%-80%	42-44	401	-	-	-	-
25	SILTY TO CLAYEY F.S.	232.8	6.21	77 71	1.135	80%-90%	44-46	512	-	-	-	-

## PIEZOCONE SOUNDING TEST



+ PUSH INTERRUPTED TO ADD ROD  
PORE PRESSURE DECAY DATA MAY BE AVAILABLE

FILE #..... P.B.S. & J. KINGS LAB S. CAROLINA SOUNDING # ... PC-4 SOUNDING DATE 10/13/92 10: 27: 15	
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# Environmental Management Corporation

**Corporate Offices**  
**P.O. Box 1195, Black Mountain, North Carolina 28711**  
**Phone (704) 669-2888 : Fax (704) 669-9422**

JOB NAME ..... P B S & J  
 JOB FILE NUMBER... KINGS LAB  
 CONE SOUNDING.... PC-3

DEPTH FEET	SOIL BEHAVIOR TYPE	QC (KG/CM <sup>2</sup> )	LF (KG/CM <sup>2</sup> )	N N' VALUES	VERTICAL EFFECTIVE STRESS (KG/CM <sup>2</sup> )	RELATIVE DENSITY (%)	FRICTION ANGLE (DEGREES)	YOUNG'S MODULUS (KG/CM <sup>2</sup> )	UNDRAINED SHEAR STRENGTH (KG/CM <sup>2</sup> )	SENSITIVITY	COMP.	OC
#	+	++	+++	++++								
1	FINE SAND	119.3	.18	23 25	.053	190%	148	262	—	—	—	—
2	SILTY FINE SAND	73.2	.21	18 15	.102	70%-80%	148	161	—	—	—	—
	SILTY FINE SAND	43.7	.07	10 9	.151	60%-70%	44-46	96	—	—	—	—
	SILTY FINE SAND	52.2	.12	13 11	.2	60%-70%	44-46	114	—	—	—	—
5	SILTY FINE SAND	57.8	.1	14 12	.249	60%-70%	44-46	127	—	—	—	—
	ENSE OR CEMENTED SAND	207.7	.54	34 44	.307	190%	148	456	—	—	—	—
	TY TO CLAYEY F.S.	107.9	2.35	35 31	.356	70%-80%	44-46	237	—	—	—	—
3	SAND TO CLAYEY FINE SAND	110.3	4.28	55 39	.41	70%-80%	44-46	242	—	—	—	—
	VERY STIFF FINE GRAINED	100.2	4.86	100 39	.459	—	—	—	6.25	2	UD	16
	VERY STIFF FINE GRAINED	118.1	6.41	118 49	.507	—	—	—	7.36	1.8	UD	16
	VERY STIFF FINE GRAINED	128	8.56	128 60	.556	—	—	—	7.98	1.4	UD	16
12	VERY STIFF FINE GRAINED	124.1	9.95	124 65	.605	—	—	—	7.73	1.2	UD	16
	VERY STIFF FINE GRAINED	146	9.99	146 69	.654	—	—	—	9.09	1.4	UD	16
	VERY STIFF FINE GRAINED	142.6	10.37	142 70	.703	—	—	—	8.87	1.3	UD	16

# N' = POINT STRESS \* (.24 .04 \* FRICTION RATIO)

+

NORMALLY CONSOLIDATED SANDS

++ FOR OVERCONSOLIDATED SANDS, SLIGHTLY REDUCE ABOVE FRICTION ANGLES

+++ FOR OVERCONSOLIDATED SANDS, YOUNG'S MODULUS MAY BE AS MUCH AS 3 TO 6 TIMES HIGHER

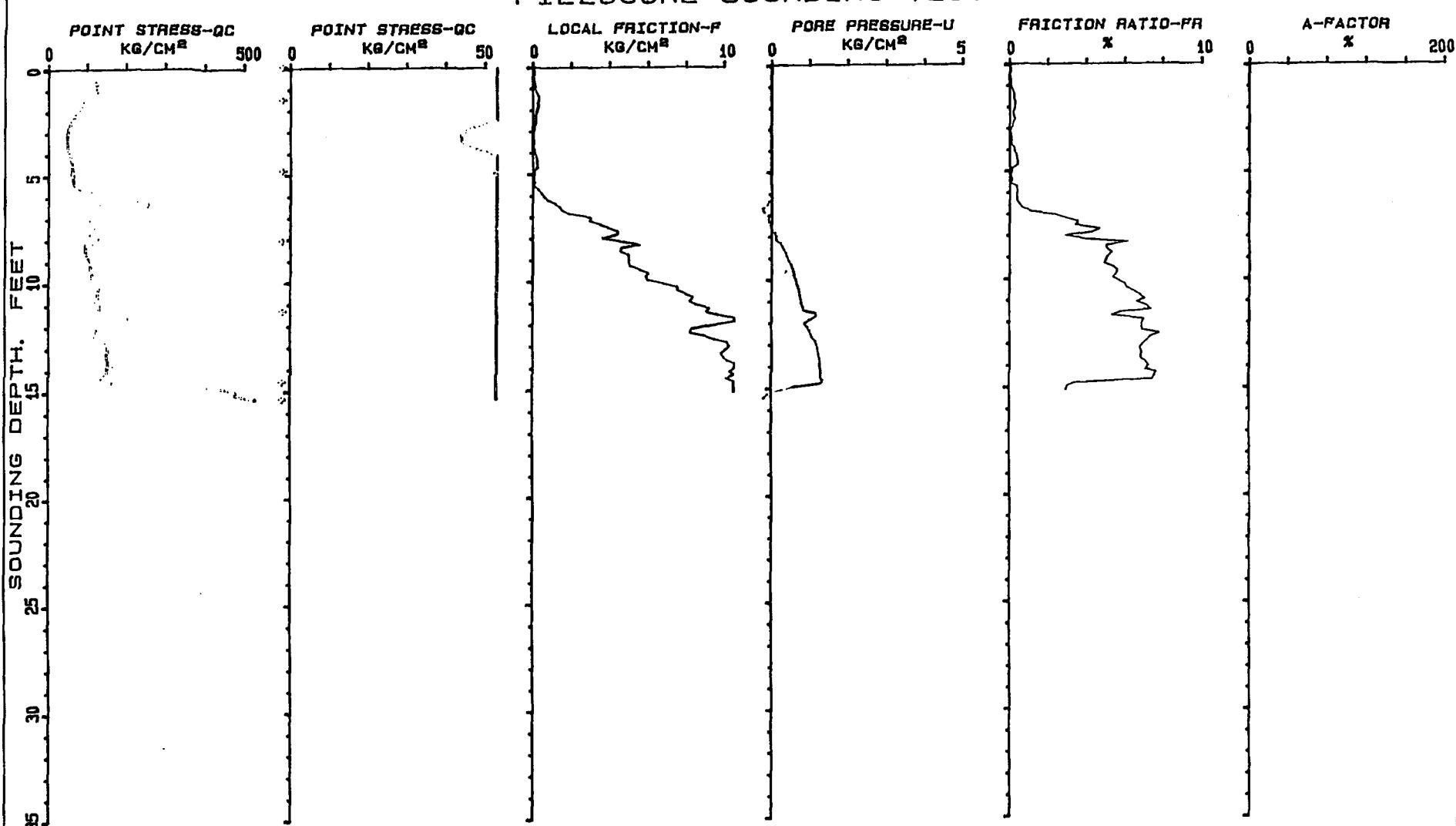
\*\*\*\* NK OF 16 USED. FOR OVERCONSOLIDATED CLAYS, AN NK OF 17 IS SUGGESTED

THE ABOVE DATA WAS COMPUTED FOLLOWING 'BASIC' GUIDELINES BY P. K. ROBERTSON AND R. G. CAMPANELLA IN THE HANDBOOK  
 'GUIDELINES FOR USE AND INTERPRETATION OF THE ELECTRONIC CONE PENETRATION TEST'

SEPTEMBER, 1984

ADDITIONAL LOCAL CORRELATIONS DEVELOPED BY IN-SITU TECHNOLOGY HAVE ALSO BEEN USED IN COMPUTING THE ABOVE DATA.  
 IT IS THE POLICY OF IN-SITU TECHNOLOGY TO CONTINUALLY UPGRADE AND MODIFY C.P.T CORRELATIONS AS  
 PUBLISHED RESEARCH AND LOCAL EXPERIENCE GROWS.

## PIEZOCONE SOUNDING TEST



PUSH INTERRUPTED TO ADD ROD  
PORE PRESSURE DECAY DATA MAY BE AVAILABLE

FILE #..... P.B.S. & J.	
KINGS LAB	
S. CAROLINA	
SONDING # .... PC-3	
SONDING DATE 10/13/92 09: 17: 44	



# *Environmental Management Corporation*

## **Corporate Offices**

P.O. Box 1195, Black Mountain, North Carolina 28711  
 Phone (704) 669-2888 : Fax (704) 669-9422

JOB NAME ..... P B S & J

JOB FILE NUMBER... KINGS LAB

CONE SOUNDING..... PC-5

TH ET	SOIL BEHAVIOR TYPE	QC (KG/CM <sup>2</sup> )	LF (KG/CM <sup>2</sup> )	N N' VALUES	VERTICAL EFFECTIVE STRESS (KG/CM <sup>2</sup> )	RELATIVE DENSITY (%)	FRICTION ANGLE (DEGREES)	YOUNG'S MODULUS (KG/CM <sup>2</sup> )	UNDRAINED SHEAR STRENGTH (KG/CM <sup>2</sup> )	SENSITIVITY	COMP.	DC
#	*	**	***	****								
SILTY TO CLAYEY F.S.		29.2	.21	9 7	.048	50%-60%	148	64	—	—	—	—
SILTY FINE SAND		36	.02	9 7	.097	60%-70%	46-48	79	—	—	—	—
AY		2.8	.06	2 1	.136	—	—	—	.19	4.3	.08	6
FINE SAND		107.5	.98	21 25	.19	80%-90%	148	236	—	—	—	—
FINE SAND		284.4	3.67	56 72	.244	190%	148	625	—	—	—	—
SILTY FINE SAND		349.3	6.99	87 98	.293	190%	148	768	—	—	—	—
FINE SAND		372.5	4.91	74 94	.346	190%	148	819	—	—	—	—
FINE SAND		236.3	2.31	47 57	.4	190%	148	519	—	—	—	—
SILTY TO CLAYEY F.S.		70.5	1.19	23 19	.449	60%-70%	42-44	155	—	—	—	—
FINE SAND		372.4	3.84	74 90	.503	190%	148	819	—	—	—	—
FINE SAND		607.6	8.26	121 155	.556	190%	148	1336	—	—	—	—

\* N' = POINT STRESS + (.2 + .04 \* FRICTION RATIO)

\* NORMALLY CONSOLIDATED SANDS

\*\* FOR OVERCONSOLIDATED SANDS, SLIGHTLY REDUCE ABOVE FRICTION ANGLES

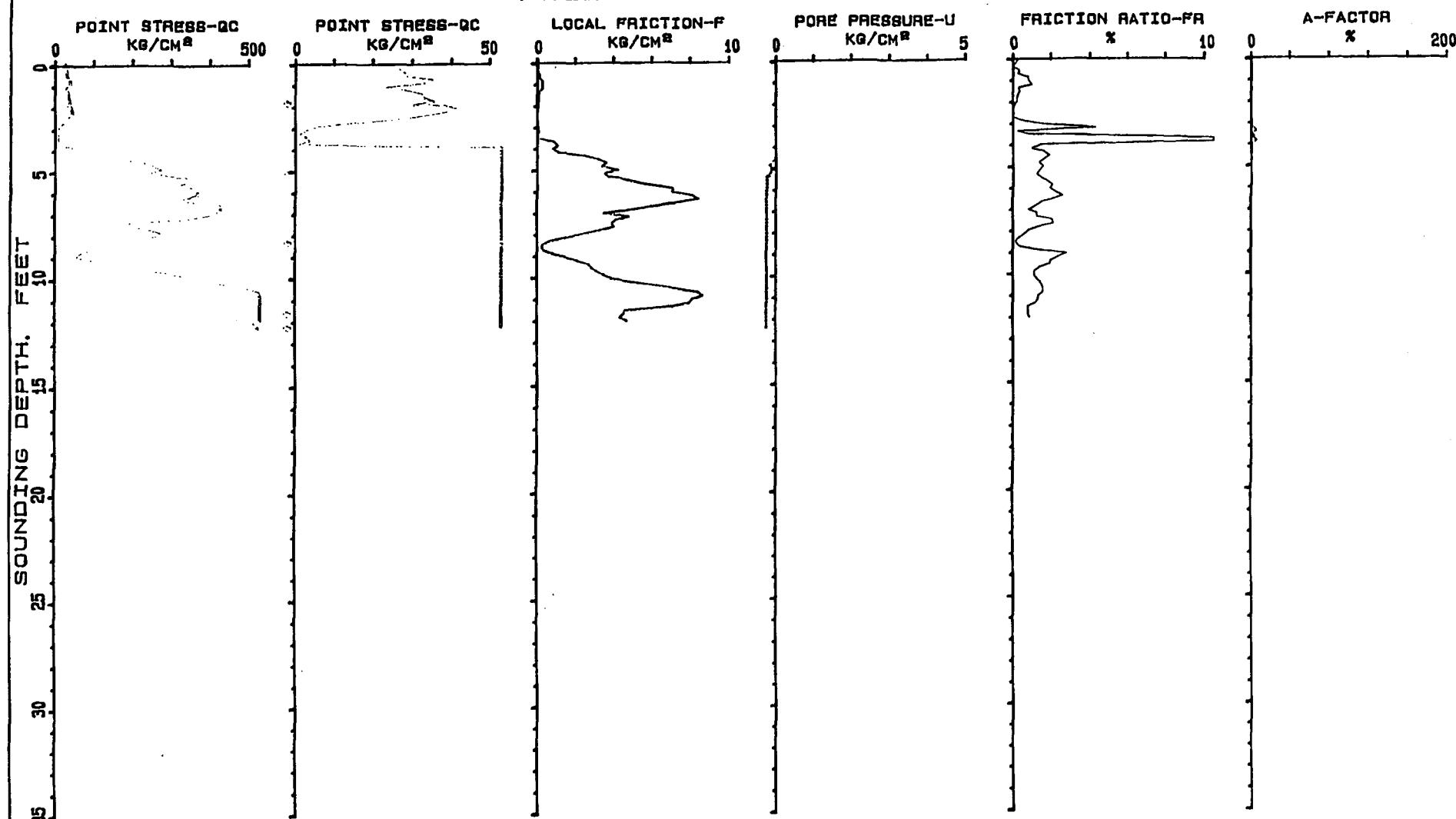
\*\*\* FOR OVERCONSOLIDATED SANDS, YOUNG'S MODULUS MAY BE AS MUCH AS 3 TO 6 TIMES HIGHER

\*\*\*\* NK OF 16 USED. FOR OVERCONSOLIDATED CLAYS, AN NK OF 17 IS SUGGESTED

THE ABOVE DATA WAS COMPUTED FOLLOWING 'BASIC' GUIDELINES BY P. K. ROBERTSON AND R. G. CAMPANELLA IN THE HANDBOOK  
 'GUIDELINES FOR USE AND INTERPRETATION OF THE ELECTRONIC CONE PENETRATION TEST'  
 SEPTEMBER, 1984

ADDITIONAL LOCAL CORRELATIONS DEVELOPED BY IN-SITU TECHNOLOGY HAVE ALSO BEEN USED IN COMPUTING THE ABOVE DATA.  
 IT IS THE POLICY OF IN-SITU TECHNOLOGY TO CONTINUALLY UPGRADE AND MODIFY C.P.T CORRELATIONS AS  
 PUBLISHED RESEARCH AND LOCAL EXPERIENCE GROWS.

# PIEZOCONE SOUNDING TEST

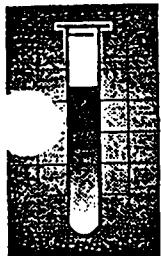


+ PUSH INTERRUPTED TO ADD ROD  
PORE PRESSURE DECAY DATA MAY BE AVAILABLE

FILE #..... P.B.S. & J.	
KINGS LAB	
S. CAROLINA	
SONDING # ... PC-5	
SONDING DATE 10/14/92 10:12:36	

**APPENDIX B**

**CURRENT ANALYTICAL RESULTS**



# Columbia Analytical Laboratories, inc.

4265 Augusta Highway, Suite G □ Lexington, SC 29073

## Laboratory Report

(803)957-6608 FAX(803)957-6912

LAB# : 910708-21  
JOB# : 01471

DATE: July 30, 1991

**REPORT FOR: GROUNDWATER ANALYSIS**

CLIENT: KINGS LABORATORY, INC.  
POST OFFICE BOX 120  
BLYTHEWOOD SC 29016

Samples were received by Columbia Analytical Laboratories, Inc. on 07/08/91, at 09:33, and were collected using proper EPA protocol.

LABORATORY ID # 32114.

ORGANICS LABORATORY ID # 10120.

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS
A	OFFICE <i>Septic Tank</i>	PPO - ACID COMPOUNDS	.	
		p-CHLORO-m-cresol	<15	ppb
		2-CHLOROPHENOL	<15	ppb
		2,4-DICHLOROPHENOL	<15	ppb
		2,4-DIMETHYLPHENOL	<15	ppb
		2,4-DINITROPHENOL	<15	ppb
		4,6-DINITRO-O-CRESOL	<15	ppb
		2-NITROPHENOL	<15	ppb
		4-NITROPHENOL	<15	ppb
		PENTACHLOROPHENOL	<15	ppb
		PHENOL	<15	ppb
		2,4,6-TRICHLOROPHENOL	<15	ppb
		PPO - BASE/NEUTRAL COMPOUNDS	.	
		ACENAPHTHENE	<15	ppb
		ACENAPHTHYLENE	<15	ppb
		ALDRIN	<0.04	ppb
		ANTHRACENE	<15	ppb
		AROCLOR 1016	<1	ppb
		AROCLOR 1221	<1	ppb
		AROCLOR 1232	<1	ppb
		AROCLOR 1242	<1	ppb
		AROCLOR 1248	<1	ppb
		AROCLOR 1254	<1	ppb
		AROCLOR 1260	<1	ppb
		BENZO(A)ANTHRACENE	<15	ppb
		BENZO(B)FLUORANTHENE	<15	ppb

This report is continued on the next page....

Continuation of report for GROUNDWATER ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS
		BENZO(K) FLUORANTHENE	<15	ppb
		BENZO(GHI) PERYLENE	<15	ppb
		BENZO(A) PYRENE	<15	ppb
		METHOXYCHLOR	<100	ppb
		A-BHC	<0.03	ppb
		B-BHC	<0.06	ppb
		G-BHC (LINDANE)	<0.04	ppb
		D-BHC	<0.09	ppb
		BIS(2-CHLOROETHYL) ETHER	<15	ppb
		BIS(2-CHLOROETHOXY) METHANE	<15	ppb
		BIS(2-CHLOROISOPROPYL) ETHER	<15	ppb
		BIS(CHLOROMETHYL) ETHER	<10	ppb
		BIS(2-ETHYLHEXYL) PHTHALATE	<15	ppb
		BUTYLBENZYL PHTHALATE	<15	ppb
		CHLORDANE (TECHNICAL)	<0.14	ppb
		4-CHLOROPHENYL PHENYL ETHER	<15	ppb
		4-BROMOPHENYL PHENYL ETHER	<15	ppb
		2-CHLORONAPHTHALENE	<15	ppb
		CHRYSENE	<15	ppb
		P,P'-DDE	<0.04	ppb
		P,P'-DDD	<0.11	ppb
		P,P'-DDT	<0.12	ppb
		DIBENZO(A,H) ANTHRACENE	<15	ppb
		DI-N-BUTYL PHTHALATE	<15	ppb
		3,3'-DICHLOROBENZIDINE	<15	ppb
		DIELDRIN	<0.02	ppb
		DIETHYL PHTHALATE	<15	ppb
		DIMETHYL PHTHALATE	<15	ppb
		2,4-DINITROTOLUENE	<15	ppb
		2,6-DINITROTOLUENE	<15	ppb
		DI-N-OCTYL PHTHALATE	<15	ppb
		ENDOSULFAN I	<0.14	ppb
		ENDOSULFAN II	<0.04	ppb
		ENDOSULFAN SULFATE	<0.66	ppb
		ENDRIN	<0.06	ppb
		ENDRIN ALDEHYDE	<0.23	ppb
		FLUORANTHENE	<15	ppb
		FLUORENE	<15	ppb
		HEPTACHLOR	<0.03	ppb
		HEPTACHLOR EPOXIDE	<0.83	ppb
		HEXACHLOROBENZENE	<15	ppb
		HEXACHLOROBUTADIENE	<15	ppb
		HEXACHLOROCYCLOPENTADIENE	<15	ppb
		HEXACHLOROETHANE	<15	ppb

This report is continued on the next page....

Continuation of report for GROUNDWATER ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS
		INDENO(1,2,3-CD) PYRENE	<15	ppb
		ISOPHORONE	<15	ppb
		NAPHTHALENE	<15	ppb
		NITROBENZENE	<15	ppb
		N-NITROSODIPHENYLAMINE	<15	ppb
		N-NITROSO-DI-N-PROPYLAMINE	<15	ppb
		PHENANTHRENE	<15	ppb
		PYRENE	<15	ppb
		TOXAPHENE	<2.4	ppb
		1,2,4-TRICHLOROBENZENE	<15	ppb
		PPO - VOLATILE ORGANICS	.	
		ACROLEIN	<100	ppb
		ACRYLONITRILE	<100	ppb
		BENZENE	<5	ppb
		BROMOFORM	<5	ppb
		CARBON TETRACHLORIDE	<5	ppb
		CHLOROBENZENE	<5	ppb
		CHLORODIBROMOMETHANE	<5	ppb
		CHLOROETHANE	<10	ppb
		2-CHLOROETHYL VINYL ETHER	<10	ppb
		CHLOROFORM	<5	ppb
		1,2-DICHLOROBENZENE	<5	ppb
		1,3-DICHLOROBENZENE	<5	ppb
		1,4-DICHLOROBENZENE	<5	ppb
		DICHLOROBROMOMETHANE	<5	ppb
		DICHLORODIFLUOROMETHANE	<10	ppb
		1,1-DICHLOROETHANE	<5	ppb
		1,2-DICHLOROETHANE	<5	ppb
		1,1-DICHLOROETHYLENE	<5	ppb
		TRANS-1,2-DICHLOROETHYLENE	<5	ppb
		1,2-DICHLOROPROPANE	<5	ppb
		1,2-DICHLOROPROPYLENE (TRANS)	<5	ppb
		1,3-DICHLOROPROPYLENE (CIS)	<5	ppb
		ETHYLBENZENE	<5	ppb
		METHYL BROMIDE	<10	ppb
		METHYL CHLORIDE	<10	ppb
		METHYLENE CHLORIDE	<5	ppb
		1,1,2,2-TETRACHLOROETHANE	<5	ppb
		TETRACHLOROETHYLENE	<5	ppb
		TOLUENE	<5	ppb
		1,1,1-TRICHLOROETHANE	<5	ppb
		1,1,2-TRICHLOROETHANE	<5	ppb
		TRICHLOROETHYLENE	<5	ppb
		TRICHLOROFUOROMETHANE	<5	ppb

This report is continued on the next page...

ntinuation of report for GROUNDWATER ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS
B	LAB <i>Septic Tank</i>	VINYL CHLORIDE WELL CERTIFICATION ANALYSIS SILVER ALKALINITY ARSENIC BARIUM BICARBONATE CALCIUM CARBONATE CADMIUM CHLORIDE COLOR CHROMIUM COPPER IRON FLUORIDE MERCURY POTASSIUM LAB pH MAGNESIUM MANGANESE SODIUM NITRATE LEAD (FURNACE) SELENIUM SULFATE TOTAL SOLIDS TURBIDITY ZINC PPO - ACID COMPOUNDS p-CHLORO-m-cresol 2-CHLOROPHENOL 2,4-DICHLOROPHENOL 2,4-DIMETHYLPHENOL 2,4-DINITROPHENOL 4,6-DINITRO-O-CRESOL 2-NITROPHENOL 4-NITROPHENOL PENTACHLOROPHENOL PHENOL 2,4,6-TRICHLOROPHENOL PPO - BASE/NEUTRAL COMPOUNDS ACENAPHTHENE ACENAPHTHYLENE	<5 .005 156 <0.005 <0.1 156 9 0 0.0006 36 175 <0.05 0.10 3.3 0.2 0.0003 10 6.8 4 0.28 9 0.5 <0.005 <0.01 42 379 212.5 0.51 .005 <26 <26 <26 <26 <26 <26 <26 <26 <26 <26 <26 <26 <26 <26 <26 .	ppb ppm ppm ppm ppm ppm ppm ppm ppm ppm CU ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm std.units ppm ppm ppm ppm ppm ppm ppm NTU ppm ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb

This report is continued on the next page....

Continuation of report for GROUNDWATER ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS
		ALDRIN	<0.4	ppb
		ANTHRACENE	<26	ppb
		AROCLOR 1016	<10	ppb
		AROCLOR 1221	<10	ppb
		AROCLOR 1232	<10	ppb
		AROCLOR 1242	<10	ppb
		AROCLOR 1248	<10	ppb
		AROCLOR 1254	<10	ppb
		AROCLOR 1260	<10	ppb
		BENZO(A)ANTHACENE	<26	ppb
		BENZO(B)FLUORANTHENE	<26	ppb
		BENZO(K)FLUORANTHENE	<26	ppb
		BENZO(GHI)PERYLENE	<26	ppb
		BENZO(A)PYRENE	<26	ppb
		METHOXYPHOR	<1000	ppb
		A-BHC	<0.3	ppb
		B-BHC	<0.6	ppb
		G-BHC (LINDANE)	<0.4	ppb
		D-BHC	<0.9	ppb
		BIS(2-CHLOROETHYL)ETHER	<26	ppb
		BIS(2-CHLOROETHOXY)METHANE	<26	ppb
		BIS(2-CHLOROISOPROPYL)ETHER	<26	ppb
		BIS(CHLOROMETHYL)ETHER	<10	ppb
		BIS(2-ETHYLHEXYL)PHTHALATE	<26	ppb
		BUTYLBENZYLPHthalate	<26	ppb
		CHLORDANE (TECHNICAL)	<1.4	ppb
		4-CHLOROPHENYL PHENYL ETHER	<26	ppb
		4-BROMOPHENYL PHENYL ETHER	<26	ppb
		2-CHLORONAPHTHALENE	<26	ppb
		CHRYSENE	<26	ppb
		P,P'-DDE	<0.4	ppb
		P,P'-DDD	<1.1	ppb
		P,P'-DDT	<1.2	ppb
		DIBENZO(A,H)ANTHACENE	<26	ppb
		DI-N-BUTYLPHthalate	<26	ppb
		3,3'-DICHLOROBENZIDINE	<26	ppb
		DIELDRIN	<0.2	ppb
		DIETHYLPHthalate	<26	ppb
		DIMETHYLPHthalate	<26	ppb
		2,4-DINITROTOLUENE	<26	ppb
		2,6-DINITROTOLUENE	<26	ppb
		DI-N-OCTYLPHthalate	<26	ppb
		ENDOSULFAN I	<1.4	ppb
		ENDOSULFAN II	<0.4	ppb

This report is continued on the next page....

tinuation of report for GROUNDWATER ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS
		ENDOSULFAN SULFATE	<6.6	ppb
		ENDRIN	<0.6	ppb
		ENDRIN ALDEHYDE	<2.3	ppb
		FLUORANTHENE	<26	ppb
		FLUORENE	<26	ppb
		HEPTACHLOR	<0.3	ppb
		HEPTACHLOR EPOXIDE	<8.3	ppb
		HEXACHLOROBENZENE	<26	ppb
		HEXACHLOROBUTADIENE	<26	ppb
		HEXACHLOROCYCLOPENTADIENE	<26	ppb
		HEXACHLOROETHANE	<26	ppb
		INDENO(1,2,3-CD) PYRENE	<26	ppb
		ISOPHORONE	<26	ppb
		NAPHTHALENE	<26	ppb
		NITROBENZENE	<26	ppb
		N-NITROSODIPHENYLAMINE	<26	ppb
		N-NITROSO-DI-N-PROPYLAMINE	<26	ppb
		PHENANTHRENE	<26	ppb
		PYRENE	<26	ppb
		TOXAPHENE	<24	ppb
		1,2,4-TRICHLOROBENZENE	<26	ppb
		PPO - VOLATILE ORGANICS	.	
		ACROLEIN	<1000	ppb
		ACRYLONITRILE	<1000	ppb
		BENZENE	<100	ppb
		BROMOFORM	<100	ppb
		CARBON TETRACHLORIDE	<100	ppb
		CHLOROBENZENE	<100	ppb
		CHLORODIBROMOMETHANE	<100	ppb
		CHLOROETHANE	<200	ppb
		2-CHLOROETHYLVINYL ETHER	<200	ppb
		CHLOROFORM	<100	ppb
		1,2-DICHLOROBENZENE	<100	ppb
		1,3-DICHLOROBENZENE	<100	ppb
		1,4-DICHLOROBENZENE	<100	ppb
		DICHLOROBROMOMETHANE	<100	ppb
		DICHLORODIFLUOROMETHANE	<10	ppb
		1,1-DICHLOROETHANE	<100	ppb
		1,2-DICHLOROETHANE	<100	ppb
		1,1-DICHLOROETHYLENE	<100	ppb
		TRANS-1,2-DICHLOROETHYLENE	<100	ppb
		1,2-DICHLOROPROPANE	<100	ppb
		1,2-DICHLOROPROPYLENE (TRANS)	<100	ppb
		1,3-DICHLOROPROPYLENE (CIS)	<100	ppb

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Continuation of report for GROUNDWATER ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS
		ETHYLBENZENE	<100	ppb
		METHYL BROMIDE	<200	ppb
		METHYL CHLORIDE	<200	ppb
		METHYLENE CHLORIDE	260	ppb
		1,1,2,2-TETRACHLOROETHANE	<100	ppb
		TETRACHLOROETHYLENE	<100	ppb
		TOLUENE	180	ppb
		1,1,1-TRICHLOROETHANE	<100	ppb
		1,1,2-TRICHLOROETHANE	<100	ppb
		TRICHLOROETHYLENE	<100	ppb
		TRICHLOROFLUOROMETHANE	<100	ppb
		VINYL CHLORIDE	<100	ppb
		WELL CERTIFICATION ANALYSIS	.	
		SILVER	<0.05	ppm
		ALKALINITY	73	ppm
		ARSENIC	<0.005	ppm
		BARIUM	<0.1	ppm
		BICARBONATE	73	ppm
		CALCIUM	19	ppm
		CARBONATE	0	ppm
		CADMIUM	0.0013	ppm
		CHLORIDE	76	ppm
		COLOR	600	CU
		CHROMIUM	<0.05	ppm
		COPPER	0.10	ppm
		IRON	4.5	ppm
		FLUORIDE	0.2	ppm
		MERCURY	0.0035	ppm
		POTASSIUM	6	ppm
		LAB pH	6.7	std.units
		MAGNESIUM	5	ppm
		MANGANESE	0.31	ppm
		SODIUM	20	ppm
		NITRATE	0.5	ppm
		LEAD (FURNACE)	0.019	ppm
		SELENIUM	0.048	ppm
		SULFATE	100	ppm
		TOTAL SOLIDS	1974	ppm
		TURBIDITY	160	NTU
		ZINC	0.43	ppm

This report is continued on the next page....

GAS CHROMATOGRAPH FIELD DATA RECORD

Client : PBS & J  
Columbia, SC

DATE : Oct. 15, 1992  
Site ID:  
EMC ID : EMC92-1012-92

Contact: Randy Hunt

Site Description: Kings Laboratory Blythewood, SC  
GC Model No. / Serial No. = Photovac 10SSU / 6180186

Analyst: Dana Randall

PARAMETER	SAMPLE NUMBER	DESC.	INJ.	CONC. (ppb)	
			VOL.	GAIN	INITIAL FINAL
	7196	HC2-32	100	20	
MTBE					0.0
Benzene					0.0
Toluene					0.0
Chlorobenzene					0.0
Ethyl benzene					0.0
m Xylene					5j
o Xylene					2j
					0.0
					0.0
					0.0

-----601-----

Vinyl Chloride		0.0
trans-1,2 Dichloroethylene		0.0
1,1 Dichloroethane		0.0
1,2 Dichloroethane		0.0
1,1,1 Trichloroethane		0.0
Trichloroethylene		0.0
1,1,2 Trichloroethane		0.0
1,1,2,2 Trichloroethane		0.0
Tetrachloroethylene		0.0
2-Chloro-vinyl-ether		0.0
Methylene Chloride		0.0
Chloroform		0.0
1,2 Dichloropropane		0.0

COMMENTS: \_j = estimated value

Page      of

GAS CHROMATOGRAPH FIELD DATA RECORD

Client : PBS & J  
Columbia, SC

DATE : Oct. 17, 1992  
Site ID:  
EMC ID : EMC92-1012-92

Contact: Randy Hunt

Site Description: Kings Laboratory Blythewood, SC

GC Model No. / Serial No. = Photovac 10S50 / 6180186

Analyst: Dana Randall

PARAMETER	SAMPLE	INJ.	CONC. (ppb)				
	NUMBER		DESC.	VOL.	GAIN	INITIAL	FINAL
	7210	HC2-52		100	20		
MTBE						0.0	
Benzene						0.0	
Toluene						0.0	
Chlorobenzene						0.0	
Ethyl benzene						0.0	
m Xylene						0.0	
o Xylene						0.0	
						0.0	
						0.0	

----- 601 -----

Vinyl Chloride		0.0
trans-1,2 Dichloroethylene		0.0
1,1 Dichloroethane		0.0
1,2 Dichloroethane		0.0
1,1,1 Trichloroethane		0.0
Trichloroethylene		0.0
1,1,2 Trichloroethane		0.0
1,1,2,2 Trichloroethane		0.0
Tetrachloroethylene		0.0
2-Chloro-vinyl-ether		0.0
Methylene Chloride		0.0
Chloroform		0.0
1,2 Dichloropropane		0.0

COMMENTS: -----  
Page      of      .

**GAS CHROMATOGRAPH FIELD DATA RECORD**

**Client : PBS & J**  
**Columbia, SC**

DATE : Oct-15-1992

### **Site IV:**

EMC ID : EMC92-1012-92

Contact: Randy Hunt

**Site Description:** Kings Laboratory Blythewood-SC

GC Model No. / Serial No. = Photovac 10550 / 61B0186

**Analyst:** Vana Randall

**COMMENTS:**

GAS CHROMATOGRAPH FIELD DATA RECORD

Client : PBS & J  
Columbia, SC

DATE : Oct.13,1992  
Site ID:  
EMC ID : EMC92-1012-92

Contact: Randy Hunt

Site Description: Kings Laboratory Blythewood, SC

GC Model No. / Serial No. = Photovac 10S50 / 6180186

Analyst: Dana Randall

PARAMETER	SAMPLE NUMBER	DESC.	INJ.	CONC. (ppb)	
			VOL.	GAIN	INITIAL FINAL
	7187	HC4-16	100	20	
MTBE					0.0
Benzene					7
Toluene					0.0
Chlorobenzene					0.0
Ethyl benzene					0.0
m Xylene					0.0
o Xylene					11
					0.0
					0.0
					0.0
-----	601	-----	-----	-----	-----
Vinyl Chloride					0.0
trans-1,2 Dichloroethylene					0.0
1,1 Dichloroethane					0.0
1,2 Dichloroethane					0.0
1,1,1 Trichloroethane					0.0
Trichloroethylene					26
1,1,2 Trichloroethane					0.0
1,1,2,2 Trichloroethane					0.0
Tetrachloroethylene					0.0
2-Chloro-vinyl-ether					0.0
Methylene Chloride					0.0
Chloroform					0.0
1,2 Dichloropropane					0.0

COMMENTS: -----

GAS CHROMATOGRAPH FIELD DATA RECORD

Client : PBS & J  
Columbia, SC

DATE : Oct. 13, 1992

Site ID:

EMC ID : EMC92-1012-92

Contact: Randy Hunt

Site Description: Kings Laboratory Blythewood, SC

GC Model No. / Serial No. = Photovac 10950 / 6180186

Analyst: Dana Randall

PARAMETER	SAMPLE	INJ.	CONC. (ppb)	
	NUMBER	DESC.	VOL.	GAIN

7185 HC4-26.2 100 20

MTBE	-----	0.0
Benzene	-----	130
Toluene	-----	289
Chlorobenzene	-----	0.0
Ethyl benzene	-----	17
m Xylene	-----	2j
o Xylene	-----	2j
	-----	0.0
	-----	0.0
	-----	0.0

----- 601 -----

Vinyl Chloride	-----	0.0
trans-1,2 Dichloroethylene	-----	0.0
1,1 Dichloroethane	-----	0.0
1,2 Dichloroethane	-----	0.0
1,1,1 Trichloroethane	-----	0.0
Trichloroethylene	-----	1400
1,1,2 Trichloroethane	-----	0.0
1,1,2,2 Trichloroethane	-----	0.0
Tetrachloroethylene	-----	0.0
2-Chloro-vinyl-ether	-----	0.0
Methylene Chloride	-----	0.0
Chloroform	-----	0.0
1,2 Dichloropropane	-----	0.0

COMMENTS: j = estimated value \_\_\_\_\_  
Page \_\_\_\_ of \_\_\_\_ .

GAS CHROMATOGRAPH FIELD DATA RECORD

Client : PBS & J  
 Columbia, SC

DATE : Oct. 16, 1992

Site ID:

EMC ID : EMC92-1012-92

Contact: Randy Hunt

Site Description: Kings Laboratory Blythewood, SC

GC Model No. / Serial No. = Photovac 10S50 / 6180186

Analyst: Dana Randall

PARAMETER	SAMPLE NUMBER	DESC.	INJ.	CONC. (ppb)	
			VOL.	GAIN	INITIAL FINAL
	7204	HC6-23	100 & 50	20	
MtBE					0.0
Benzene				409	818
Toluene					161
Chlorobenzene					0.0
Ethyl benzene					8
m Xylene					0.0
o Xylene					6
					0.0
					0.0
					0.0

-----601-----

Vinyl Chloride		0.0
trans-1,2 Dichloroethylene		0.0
1,1 Dichloroethane		0.0
1,2 Dichloroethane		0.0
1,1,1 Trichloroethane		0.0
Trichloroethylene		268
1,1,2 Trichloroethane		0.0
1,1,2,2 Trichloroethane		0.0
Tetrachloroethylene		0.0
2-Chloro-vinyl-ether		0.0
Methylene Chloride		0.0
Chloroform		0.0
1,2 Dichloropropane		0.0

COMMENTS: -----

GAS CHROMATOGRAPH FIELD DATA RECORD

Client : PBS & J  
Columbia, SC

DATE : Oct. 15, 1992  
Site ID:  
EMC ID : EMC92-1012-92

Contact: Randy Hunt

Site Description: Kings Laboratory Blythewood, SC  
GC Model No. / Serial No. = Photovac 10S50 / 6180186

Analyst: Dana Randall

PARAMETER	SAMPLE	INJ.	CONC. (ppb)	
	NUMBER	DESC.	VOL.	GAIN

7194 HC7-33 100 20

MTBE			0.0
Benzene			0.0
Toluene			0.0
Chlorobenzene			0.0
Ethyl benzene			7
m Xylene			0.0
o Xylene			0.0
			0.0
			0.0
			0.0
			0.0

601

Vinyl Chloride		0.0
trans-1,2 Dichloroethylene		0.0
1,1 Dichloroethane		0.0
1,2 Dichloroethane		0.0
1,1,1 Trichloroethane		0.0
Trichloroethylene		256
1,1,2 Trichloroethane		0.0
1,1,2,2 Tetrachloroethane		0.0
Tetrachloroethylene		0.0
2-Chloro-vinyl-ether		0.0
Methylene Chloride		0.0
Chlorotform		0.0
1,2 Dichloropropane		0.0

COMMENTS:

**GAS CHROMATOGRAPH FIELD DATA RECORD**

**Client : PBS & J  
Columbia, SC**

DATE : Oct. 15, 1992  
Site ID:  
EMC ID : EMC92-1012-92

Contact: Randy Hunt

Site Description: Kings Laboratory Blythewood, SC  
GC Model No. / Serial No. = Photovac 10550 / 6180186

Analyst: Dana Randall

PARAMETER	SAMPLE	INJ.		CONC. (ppb)		
	NUMBER	DESC.	VOL.	GAIN	INITIAL	FINAL

7198 HC8-32.5 100 20

MTBE	-----	0.0
Benzene	-----	0.0
Toluene	-----	0.0
Chlorobenzene	-----	0.0
Ethyl benzene	-----	0.0
m Xylene	-----	0.0
o Xylene	-----	0.0
	-----	0.0
	-----	0.0

601

Vinyl Chloride	-----	0.0
trans-1,2 Dichloroethylene	-----	0.0
1,1 Dichloroethane	-----	0.0
1,2 Dichloroethane	-----	0.0
1,1,1 Trichloroethane	-----	0.0
Trichloroethylene	-----	31
1,1,2 Trichloroethane	-----	0.0
1,1,2,2 Trichloroethane	-----	0.0
Tetrachloroethylene	-----	0.0
2-Chloro-vinyl-ether	-----	0.0
Methylene Chloride	-----	0.0
Chlorotorm	-----	0.0
1,2 Dichloropropane	-----	0.0

### **COMMENS-**

GAS CHROMATOGRAPH FIELD DATA RECORD

Client : PBS & J  
Columbia, SC

DATE : Oct. 15, 1992  
Site ID:  
EMC ID : EMC92-1012-92

Contact: Randy Hunt

**Site Description:** Kings Laboratory Blythewood, SC

**GC Model No. / Serial No. = Photovac 10550 / 6180186**

**Analyst:** Dana Randall

PARAMETER	SAMPLE NUMBER	DESC.	INJ. VOL.	GAIN	CONC. (ppb) INITIAL	FINAL
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7200 HC9-27.5 100 20

<b>MTBE</b>	-----	0.0
<b>Benzene</b>	-----	0.0
<b>Toluene</b>	-----	0.0
<b>Chlorobenzene</b>	-----	0.0
<b>Ethyl benzene</b>	-----	0.0
<b>m Xylene</b>	-----	0.0
<b>o Xylene</b>	-----	0.0

601

Vinyl Chloride	-----	0.0
trans-1,2 Dichloroethylene	-----	0.0
1,1 Dichloroethane	-----	0.0
1,2 Dichloroethane	-----	0.0
1,1,1 Trichloroethane	-----	0.0
Trichloroethylene	-----	0.0
1,1,2 Trichloroethane	-----	0.0
1,1,2,2 Trichloroethane	-----	0.0
tetrachloroethylene	-----	0.0
2-Chloro-vinyl-ether	-----	0.0
Methylene Chloride	-----	0.0
Chloroform	-----	0.0
1,2 Dichloropropane	-----	0.0

**COMMENTS:**

## GAS CHROMATOGRAPH FIELD DATA RECORD

Client : PBS & J  
Columbia, SCDATE : Oct. 16, 1992  
Site ID:  
EMC ID : EMC92-1012-92

Contact: Randy Hunt

Site Description: Kings Laboratory Blythewood, SC

GC Model No. / Serial No. = Photovac 10550 / 6180186

Analyst: Dana Randall

PARAMETER	SAMPLE NUMBER	DESC.	INJ.	CONC. (ppb)	
			VOL.	GAIN	INITIAL
	7203	HC10-38	100	20	
MTBE					0.0
Benzene					0.0
Toluene					0.0
Chlorobenzene					0.0
Ethyl benzene					2 <sub>j</sub>
m Xylene					0.0
o Xylene					0.0
					0.0
					0.0
					0.0
					0.0

----- 601 -----

Vinyl Chloride		0.0
trans-1,2 Dichloroethylene		0.0
1,1 Dichloroethane		0.0
1,2 Dichloroethane		0.0
1,1,1 Trichloroethane		0.0
Trichloroethylene		0.0
1,1,2 Trichloroethane		0.0
1,1,2,2 Trichloroethane		0.0
Tetrachloroethylene		0.0
2-Chloro-vinyl-ether		0.0
Methylene Chloride		0.0
Chloroform		0.0
1,2 Dichloropropane		0.0

COMMENTS: \_ j = estimated value \_\_\_\_\_  
Page \_\_\_\_ of \_\_\_\_ .

## GAS CHROMATOGRAPH FIELD DATA RECORD

Client : PBS & J  
Columbia,SC

DATE : Oct. 17, 1992  
Site ID:  
EMC ID : EMC92-1012-92

Contact: Randy Hunt

Site Description: Kings Laboratory Blythewood, SC

GC Model No. / Serial No. = Photovac 10S50 / 6180186

Analyst: Dana Kendall

PARAMETER	SAMPLE NUMBER	DESC.	INJ. VOL.	GAIN	CONC. (ppb) INITIAL FINAL
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7211 HC11-23 100 20

MTBE					0.0
Benzene					0.0
Toluene					0.0
Chlorobenzene					0.0
Ethyl benzene					0.0
m Xylene					0.0
o Xylene					0.0
					0.0
					0.0
					0.0

601

Vinyl Chloride					0.0
trans-1,2 Dichloroethylene					0.0
1,1 Dichloroethane					0.0
1,2 Dichloroethane					0.0
1,1,1 Trichloroethane					0.0
Trichloroethylene					0.0
1,1,2 Trichloroethane					0.0
1,1,2,2 Trichloroethane					0.0
Tetrachloroethylene					0.0
2-Chloro-vinyl-ether					0.0
Methylene Chloride					0.0
Chloroform					0.0
1,2 Dichloropropane					0.0

COMMENTS:

GAS CHROMATOGRAPH FIELD DATA RECORD

Client : PBS & J  
Columbia, SC

DATE : Oct. 17, 1992  
Site ID:  
EMC ID : EMC92-1012-92

Contact: Randy Hunt

Site Description: Kinds Laboratory Blythewood, SC

GC Model No. / Serial No. = Photovac 10S50 / 6180186

Analyst: Dana Randall

PARAMETER	SAMPLE NUMBER	DESC.	INJ. VOL.	GAIN	INITIAL	FINAL
	7212	HC12-32	100	20		

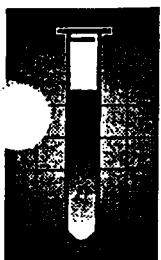
MTBE	-----	0.0
Benzene	-----	0.0
Toluene	-----	0.0
Chlorobenzene	-----	0.0
Ethyl benzene	-----	0.0
m Xylene	-----	0.0
o Xylene	-----	0.0
	-----	0.0
	-----	0.0
	-----	0.0

-----601-----

Vinyl Chloride	-----	0.0
trans-1,2 Dichloroethylene	-----	0.0
1,1 Dichloroethane	-----	0.0
1,2 Dichloroethane	-----	0.0
1,1,1 Trichloroethane	-----	0.0
Trichloroethylene	-----	0.0
1,1,2 Trichloroethane	-----	0.0
1,1,2,2 Trichloroethane	-----	0.0
Tetrachloroethylene	-----	0.0
2-Chloro-vinyl-ether	-----	0.0
Methylene Chloride	-----	0.0
Chloroform	-----	0.0
1,2 Dichloropropane	-----	0.0

COMMENTS: -----

OCT 30 1992



# Columbia Analytical Laboratories, inc.

4265 Augusta Highway, Suite G □ Lexington, SC 29073

## Laboratory Report

(803)957-6608 FAX(803)957-6912

DATE: October 27, 1992

LAB# : 921020-02  
JOB# : 01142

REPORT OF: MISCELLANEOUS ANALYSIS  
KING'S LABORATORY

CLIENT: POST, BUCKLEY, SCHUH & JERNIGAN  
MS. GINGER CLARK  
POST OFFICE BOX 106  
COLUMBIA, SC 29202

Samples were received by Columbia Analytical Laboratories, Inc. on 10/20/92, at 08:47 am, and were collected using proper EPA protocol. Testing was conducted at the locations(s) enumerated at the end of this report.

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB	
A	HC-10-38	VOLATILES (SW 846 8240) DATE OF ANALYSIS p-ISOPROPYL TOLUENE CYCLOHEXANE CHLOROMETHANE DICHLORODIFLUOROMETHANE BROMOMETHANE CHLOROETHANE TRICHLOROFUOROMETHANE trans-1,3-DICHLOROPROPENE cis-1,3-DICHLOROPROPENE 1,2-DIBROMOETHANE 2-CHLOROETHYL VINYL ETHER ACETONE HEXACHLOROBUTADIENE METHYL ETHYL KETONE NAPHTHALENE 1,2,4-TRICHLOROBENZENE cis-1,2-DICHLOROETHENE DIBROMOMETHANE 1,1-DICHLOROPROPENE 1,3-DICHLOROPROPANE 2,2-DICHLOROPROPANE 1,2,4-TRIMETHYLBENZENE 1,2,3-TRICHLOROBENZENE n-BUTYLBENZENE	.	12:30pm	10-23-92	C3

This report is continued on the next page....

continuation of report of MISCELLANEOUS ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
B	HC-6-23	1,3,5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYL BENZENE	<5	ppb	C3
		sec-BUTYLBENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1,3-DICHLOROBENZENE	<5	ppb	C3
		1,2-DICHLOROBENZENE	<5	ppb	C3
		1,4-DICHLOROBENZENE	<5	ppb	C3
		VINYLCHELORIDE	<5	ppb	C3
		1,1-DICHLOROETHENE	<5	ppb	C3
		1,1-DICHLOROETHANE	<5	ppb	C3
		trans-1,2-DICHLOROETHENE	<5	ppb	C3
		1,2-DICHLOROETHANE	<5	ppb	C3
		1,1,1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1,2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1,1,2-TRICHLOROETHANE	<5	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYL BENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3
		VOLATILES (SW 846 8240)	.		C3
		DATE OF ANALYSIS	4:47pm	10-23-92	C3
		p-ISOPROPYL TOLUENE	<50	ppb	C3
		CYCLOHEXANE	<50	ppb	C3
		CHLOROMETHANE	<50	ppb	C3
		DICHLORODIFLUOROMETHANE	<50	ppb	C3

This report is continued on the next page....

continuation of report of MISCELLANEOUS ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		BROMOMETHANE	<50	ppb	C3
		CHLOROETHANE	<50	ppb	C3
		TRICHLOROFUOROMETHANE	<50	ppb	C3
		trans-1,3-DICHLOROPROPENE	<50	ppb	C3
		cis-1,3-DICHLOROPROPENE	<50	ppb	C3
		1,2-DIBROMOETHANE	<50	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<50	ppb	C3
		ACETONE	<500	ppb	C3
		HEXACHLOROBUTADIENE	<50	ppb	C3
		METHYL ETHYL KETONE	<250	ppb	C3
		NAPHTHALENE	<50	ppb	C3
		1,2,4-TRICHLOROBENZENE	<50	ppb	C3
		cis-1,2-DICHLOROETHENE	<50	ppb	C3
		DIBROMOMETHANE	<50	ppb	C3
		1,1-DICHLOROPROPENE	<50	ppb	C3
		1,3-DICHLOROPROpane	<50	ppb	C3
		2,2-DICHLOROPROPANE	<50	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<50	ppb	C3
		1,2,3-TRICHLOROBENZENE	<50	ppb	C3
		n-BUTYLBENZENE	<50	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<50	ppb	C3
		tert-BUTYL BENZENE	<50	ppb	C3
		sec-BUTYLBENZENE	<50	ppb	C3
		BROMOCHLOROMETHANE	<50	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<50	ppb	C3
		CHLOROFORM	798	ppb	C3
		BROMOFORM	<50	ppb	C3
		BROMODICHLOROMETHANE	<50	ppb	C3
		DIBROMOCHLOROMETHANE	<50	ppb	C3
		METHYLENE CHLORIDE	127	ppb	C3
		2-CHLOROTOLUENE	<50	ppb	C3
		4-CHLOROTOLUENE	<50	ppb	C3
		1,3-DICHLOROBENZENE	<50	ppb	C3
		1,2-DICHLOROBENZENE	365	ppb	C3
		1,4-DICHLOROBENZENE	<50	ppb	C3
		VINYL CHLORIDE	<50	ppb	C3
		1,1-DICHLOROETHENE	<50	ppb	C3
		1,1-DICHLOROETHANE	<50	ppb	C3
		trans-1,2-DICHLOROETHENE	<50	ppb	C3
		1,2-DICHLOROETHANE	<50	ppb	C3
		1,1,1-TRICHLOROETHANE	53	ppb	C3
		CARBON TETRACHLORIDE	<50	ppb	C3
		1,2-DICHLOROPROPANE	<50	ppb	C3
		TRICHLOROETHENE	211	ppb	C3

This report is continued on the next page....

continuation of report of MISCELLANEOUS ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
C	HC-11-23	1,1,2-TRICHLOROETHANE	<50	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<50	ppb	C3
		TETRACHLOROETHENE	<50	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<50	ppb	C3
		CHLOROBENZENE	<50	ppb	C3
		BENZENE	367	ppb	C3
		TOLUENE	98	ppb	C3
		ETHYLBENZENE	<50	ppb	C3
		BROMOBENZENE	<50	ppb	C3
		ISOPROPYL BENZENE	<50	ppb	C3
		STYRENE	<50	ppb	C3
		o-XYLENE	<50	ppb	C3
		n-ISOPROPYLBENZENE	<50	ppb	C3
		p-XYLENE/m-XYLENE	<50	ppb	C3
		VOLATILES (SW 846 8240)	.		C3
		DATE OF ANALYSIS	6:12pm	10-23-92	C3
		p-ISOPROPYL TOLUENE	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFLUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3
		1,2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXACHLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3
		1,1-DICHLOROPROPENE	<5	ppb	C3
		1,3-DICHLOROPROPANE	<5	ppb	C3
		2,2-DICHLOROPROPANE	<5	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<5	ppb	C3
		1,2,3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYL BENZENE	<5	ppb	C3
		sec-BUTYLBENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3

This report is continued on the next page....

continuation of report of MISCELLANEOUS ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
D	HC-12-32	1, 2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1, 3-DICHLOROBENZENE	<5	ppb	C3
		1, 2-DICHLOROBENZENE	<5	ppb	C3
		1, 4-DICHLOROBENZENE	<5	ppb	C3
		VILYL CHLORIDE	<5	ppb	C3
		1, 1-DICHLOROETHENE	<5	ppb	C3
		1, 1-DICHLOROETHANE	<5	ppb	C3
		trans-1, 2-DICHLOROETHENE	<5	ppb	C3
		1, 2-DICHLOROETHANE	<5	ppb	C3
		1, 1, 1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1, 2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1, 1, 2-TRICHLOROETHANE	<5	ppb	C3
		1, 1, 1, 2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1, 1, 2, 2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYL BENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3
		VOLATILES (SW 846 8240)	.		C3
		DATE OF ANALYSIS	7:38pm	10-23-92	C3
		p-ISOPROPYL TOLUENE	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFUOROMETHANE	<5	ppb	C3
		trans-1, 3-DICHLOROPROPENE	<5	ppb	C3

This report is continued on the next page....

continuation of report of MISCELLANEOUS ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3
		1,2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXACHLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3
		1,1-DICHLOROPROPENE	<5	ppb	C3
		1,3-DICHLOROPROPANE	<5	ppb	C3
		2,2-DICHLOROPROPANE	<5	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<5	ppb	C3
		1,2,3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYL BENZENE	<5	ppb	C3
		sec-BUTYLBENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1,3-DICHLOROBENZENE	<5	ppb	C3
		1,2-DICHLOROBENZENE	<5	ppb	C3
		1,4-DICHLOROBENZENE	<5	ppb	C3
		VINYLCHLORIDE	<5	ppb	C3
		1,1-DICHLOROETHENE	<5	ppb	C3
		1,1-DICHLOROETHANE	<5	ppb	C3
		trans-1,2-DICHLOROETHENE	<5	ppb	C3
		1,2-DICHLOROETHANE	<5	ppb	C3
		1,1,1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	31	ppb	C3
		1,2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1,1,2-TRICHLOROETHANE	<5	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<5	ppb	C3

This report is continued on the next page....

continuation of report of MISCELLANEOUS ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYL BENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3

ID LABORATORY TEST LOCATION NUMBER  
C3= Columbia-organics 32114

Respectfully submitted,  
Columbia Analytical Laboratories, Inc.

7/14  
Mark W. Gilbert  
Project Director

Relinquished by: (Signature) <i>A. Michael Pelletier</i>	Date/Time 10/29/92 5:05	Received by: (Signature)	Remarks/Invoice Instructions:	Send Results To POST, BUCKLEY, SCHUH & JERNIGAN, INC. 1909 SUMTER STREET P.O. BOX 106 COLUMBIA, S.C. 29202-0106 (803) 256-7275 Attn: <i>Mike Pelletier</i>
Relinquished by: (Signature) <i>C. Wayne Black</i>	Date/Time 10/20/92 8:05	Received by: (Signature)		Date Shipped 10/20/92 Shipment Service By Hand
Relinquished by: (Signature)	Date/Time 10/20/92 8:05	Received for Laboratory by: (Signature) <i>D. M. Walker</i>		Air Bill No. Cooler No. 1/ of 1

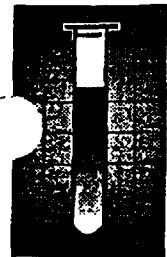
Nº 202

Waste Support

Canary : Return Copy To Sender

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921020-02



# Columbia Analytical Laboratories, inc.

4265 Augusta Highway, Suite G □ Lexington, SC 29073

## Laboratory Report

(803)957-6608 FAX(803)957-6912

DATE: November 17, 1992

LAB# : 921023-14  
JOB# : 00189

REPORT OF: PBS & J SITE SURVEY PROJECT

CLIENT: KINGS LABORATORY, INC.  
POST OFFICE BOX 120  
BLYTHEWOOD SC 29016

Samples were received by Columbia Analytical Laboratories, Inc. on 10/23/92, at 01:29 pm, and were collected using proper EPA protocol. Testing was conducted at the locations(s) enumerated at the end of this report.

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
A	EDW #1	BARIUM (FLAA/EPA 208.1) CYANIDE CONDUCTIVITY CHROMIUM FIELD PH MERCURY LEAD (FURNACE EPA - 239.2) SELENIUM (GFAA/EPA 270.2) TEMPERATURE (EPA 170.1) WATER LEVEL ELEVATION VOLATILES (SW 846 8260) DATE OF ANALYSIS p-ISOPROPYLtoluene CYCLOHEXANE CHLOROMETHANE DICHLORODIFLUOROMETHANE BROMOMETHANE CHLOROETHANE TRICHLOROFLUOROMETHANE trans-1,3-DICHLOROPROPENE cis-1,3-DICHLOROPROPENE 1,2-DIBROMOETHANE 2-CHLOROETHYL VINYL ETHER ACETONE HEXACHLOROBUTADIENE METHYL ETHYL KETONE	0.3 <0.01 85 <0.05 6.9 0.0003 <0.005 <0.005 18 468.93 . . 9:18pm <5 <5 <5 <5 <5 <5 <5 <5 <5 <5 <5 <50 <5 <25	ppm ppm umhos/cm <sup>3</sup> ppm std.units ppm ppm ppm DEGREES C feet 10-28-92 ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb ppb	C2 C1 C1 C2 C5 C2 C2 C2 C5 C5 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3 C3

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continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3
		1,1-DICHLOROPROPENE	<5	ppb	C3
		1,3-DICHLOROPROPANE	<5	ppb	C3
		2,2-DICHLOROPROPANE	<5	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<5	ppb	C3
		1,2,3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYLBENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1,3-DICHLOROBENZENE	<5	ppb	C3
		1,2-DICHLOROBENZENE	<5	ppb	C3
		1,4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1,1-DICHLOROETHENE	<5	ppb	C3
		1,1-DICHLOROETHANE	<5	ppb	C3
		trans-1,2-DICHLOROETHENE	<5	ppb	C3
		1,2-DICHLOROETHANE	<5	ppb	C3
		1,1,1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1,2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1,1,2-TRICHLOROETHANE	<5	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3

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continuation of report of PBS & J SITE SURVEY PROJECT

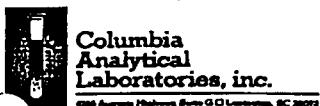
SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
B	EDW #2	STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10.0	ppm	GE
		PENTACHLOROPHENOL	<10.0	ppb	GE
		2,4- DINITROPHENOL	<45.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<10.0	ppb	GE
		2,4- DICHLOROPHENOL	<10.0	ppb	GE
		2,4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	<10.0	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAACLOROPHENE	<22.1	ppb	GE
		BARIUM (FLAA/EPA 208.1)	<0.1	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	24	umhos/cm <sup>3</sup>	C1
		CHROMIUM	<0.05	ppm	C2
		FIELD PH	6.1	std.units	C5
		MERCURY	<0.0002	ppm	C2
		LEAD (FURNACE EPA - 239.2)	<0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	<0.005	ppm	C2
		TEMPERATURE (EPA 170.1)	18	DEGREES C	C5
		WATER LEVEL ELEVATION	496.16	feet	C5
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	10:42pm	10-28-92	C3
		p-ISOPROPYLtolUENE	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3

This report is continued on the next page....

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		cis-1, 3-DICHLOROPROPENE	<5	ppb	C3
		1, 2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXACHLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1, 2, 4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1, 2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3
		1, 1-DICHLOROPROPENE	<5	ppb	C3
		1, 3-DICHLOROPROPANE	<5	ppb	C3
		2, 2-DICHLOROPROPANE	<5	ppb	C3
		1, 2, 4-TRIMETHYLBENZENE	<5	ppb	C3
		1, 2, 3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1, 3, 5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYLBENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1, 2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1, 3-DICHLOROBENZENE	<5	ppb	C3
		1, 2-DICHLOROBENZENE	<5	ppb	C3
		1, 4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1, 1-DICHLOROETHENE	<5	ppb	C3
		1, 1-DICHLOROETHANE	<5	ppb	C3
		trans-1, 2-DICHLOROETHENE	<5	ppb	C3
		1, 2-DICHLOROETHANE	<5	ppb	C3
		1, 1, 1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1, 2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1, 1, 2-TRICHLOROETHANE	<5	ppb	C3
		1, 1, 1, 2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1, 1, 2, 2-TETRACHLOROETHANE	<5	ppb	C3

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Page  
LAB#: 921023-1

continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	<10.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<45.0	ppb	GE
		2,4,6- DICHLOROPHENOL	<10.0	ppb	GE
		2,4- DICHLOROPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	<10.0	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAACLOROPHENE	<22.1	ppb	GE
C	SW #1	BARIUM (FLAA/EPA 208.1)	0.2	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	213	umhos/cm <sup>3</sup>	C1
		CHROMIUM	<0.05	ppm	C2
		FIELD PH	4.4	std.units	C5
		MERCURY	0.0014	ppm	C2
		LEAD (FURNACE EPA - 239.2)	0.015	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	<0.005	ppm	C2
		TEMPERATURE (EPA 170.1)	20	DEGREES C	C5
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	12:05am	10-29-92	C3
		p-ISOPROPYLtoluene	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3

This report is continued on the next page....

continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3
		1,2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXACHLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3
		1,1-DICHLOROPROPENE	<5	ppb	C3
		1,3-DICHLOROPROPANE	<5	ppb	C3
		2,2-DICHLOROPROPANE	<5	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<5	ppb	C3
		1,2,3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYLBENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1,3-DICHLOROBENZENE	<5	ppb	C3
		1,2-DICHLOROBENZENE	<5	ppb	C3
		1,4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1,1-DICHLOROETHENE	<5	ppb	C3
		1,1-DICHLOROETHANE	<5	ppb	C3
		trans-1,2-DICHLOROETHENE	<5	ppb	C3
		1,2-DICHLOROETHANE	<5	ppb	C3
		1,1,1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1,2-DICHLOROPROPANE	<5	ppb	C3

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Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
D	SW #2	TRICHLOROETHENE	<5	ppb	C3
		1,1,2-TRICHLOROETHANE	<5	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		O-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	<10.0	ppb	GE
		2,4- DINITROPHENOL	<45.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<10.0	ppb	GE
		2,4- DICHLOROPHENOL	<10.0	ppb	GE
		2,4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	<10.0	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAACLOROPHENE	<22.1	ppb	GE
		BARIUM (FLAA/EPA 208.1)	0.1	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	223	umhos/cm <sup>3</sup>	C1
		CHROMIUM	<0.05	ppm	C2
		FIELD PH	4.1	std.units	C5
		MERCURY	<0.0002	ppm	C2
		LEAD (FURNACE EPA - 239.2)	0.010	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	<0.005	ppm	C2
		TEMPERATURE (EPA 170.1)	19.	DEGREES C	C5

This report is continued on the next page....

continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	1:28am	10-29-92	C3
		p-ISOPROPYLtoluene	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3
		1,2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXACHLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3
		1,1-DICHLOROPROPENE	<5	ppb	C3
		1,3-DICHLOROPROPANE	<5	ppb	C3
		2,2-DICHLOROPROPANE	<5	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<5	ppb	C3
		1,2,3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYLBENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1,3-DICHLOROBENZENE	<5	ppb	C3
		1,2-DICHLOROBENZENE	<5	ppb	C3
		1,4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1,1-DICHLOROETHENE	<5	ppb	C3
		1,1-DICHLOROETHANE	<5	ppb	C3

This report is continued on the next page....

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
E	SW #3	trans-1,2-DICHLOROETHENE	<5	ppb	C3
		1,2-DICHLOROETHANE	<5	ppb	C3
		1,1,1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1,2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1,1,2-TRICHLOROETHANE	<5	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	<10.0	ppb	GE
		2,4- DINITROPHENOL	<45.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<10.0	ppb	GE
		2,4- DICHLOROPHENOL	<10.0	ppb	GE
		2,4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	<10.0	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAICLOROPHENE	<22.1	ppb	GE
		BARIUM (FLAA/EPA 208.1)	0.2	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	146	umhos/cm <sup>3</sup>	C1
		CHROMIUM	<0.05	ppm	C2

This report is continued on the next page....



Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		FIELD PH	4.3	std.units	C5
		MERCURY	0.0012	ppm	C2
		LEAD (FURNACE EPA - 239.2)	0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	<0.005	ppm	C2
		TEMPERATURE (EPA 170.1)	20	DEGREES C	C5
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	2:52am	10-29-92	C3
		p-ISOPROPYL TOLUENE	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3
		1,2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXA-CHLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3
		1,1-DICHLOROPROPENE	<5	ppb	C3
		1,3-DICHLOROPROPANE	<5	ppb	C3
		2,2-DICHLOROPROPANE	<5	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<5	ppb	C3
		1,2,3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYL BENZENE	<5	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYL BENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1,3-DICHLOROBENZENE	<5	ppb	C3

This report is continued on the next page....

continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		1, 2-DICHLOROBENZENE	<5	ppb	C3
		1, 4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1, 1-DICHLOROETHENE	<5	ppb	C3
		1, 1-DICHLOROETHANE	<5	ppb	C3
		trans-1, 2-DICHLOROETHENE	<5	ppb	C3
		1, 2-DICHLOROETHANE	<5	ppb	C3
		1, 1, 1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1, 2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1, 1, 2-TRICHLOROETHANE	<5	ppb	C3
		1, 1, 1, 2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1, 1, 2, 2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4, 6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2, 4, 5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	<10.0	ppb	GE
		2, 4- DINITROPHENOL	<45.0	ppb	GE
		2, 4, 6- TRICHLOROPHENOL	<10.0	ppb	GE
		2, 4- DICHLOROPHENOL	<10.0	ppb	GE
		2, 4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	<10.0	ppb	GE
		2, 3, 4, 6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2, 6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4, 6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE

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Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
F	PW #1	HEXAICLOROPHENE	<22.1	ppb	GE
		BARIUM (FLAA/EPA 208.1)	0.1	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	109	umhos/cm <sup>3</sup>	C1
		CHROMIUM	<0.05	ppm	C2
		FIELD PH	7.0	std.units	C5
		MERCURY	0.0015	ppm	C2
		LEAD (FURNACE EPA - 239.2)	<0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	<0.005	ppm	C2
		TEMPERATURE (EPA 170.1)	18	DEGREES C	C5
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	7:55pm	10-28-92	C3
		p-ISOPROPYL TOLUENE	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFLUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3
		1,2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXAICLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3
		1,1-DICHLOROPROPENE	<5	ppb	C3
		1,3-DICHLOROPROPANE	<5	ppb	C3
		2,2-DICHLOROPROPANE	<5	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<5	ppb	C3
		1,2,3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYLBENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3

This report is continued on the next page....

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1,3-DICHLOROBENZENE	<5	ppb	C3
		1,2-DICHLOROBENZENE	<5	ppb	C3
		1,4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1,1-DICHLOROETHENE	<5	ppb	C3
		1,1-DICHLOROETHANE	<5	ppb	C3
		trans-1,2-DICHLOROETHENE	<5	ppb	C3
		1,2-DICHLOROETHANE	<5	ppb	C3
		1,1,1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1,2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1,1,2-TRICHLOROETHANE	<5	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	<10.0	ppb	GE
		2,4- DINITROPHENOL	<45.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<10.0	ppb	GE
		2,4- DICHLOROPHENOL	<10.0	ppb	GE
		2,4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE

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continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		PHENOLS	<10.0	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAACLOROPHENE	<22.1	ppb	GE

ID LABORATORY TEST LOCATION NUMBER  
C1= Columbia-inorganics 32114  
C3= Columbia-organics 32114  
GE= Lab Certification # 10120

ID LABORATORY TEST LOCATION NUMBER  
C2= Columbia-metals 32114  
C5= Columbia-field 32114

Respectfully submitted,  
Columbia Analytical Laboratories, Inc.

*714*  
Mark W. Gilbert  
Project Director

**CHAIN-OF-CUSTODY/SAMPLE COLLECTION/ANALYSIS REQUEST**

COC #:

Client Name Kings Lab  
Report To: \_\_\_\_\_  
Address: \_\_\_\_\_  
City / St. / Zip \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
Phone / Fax \_\_\_\_\_ / \_\_\_\_\_  
Contact \_\_\_\_\_

**Project Name** \_\_\_\_\_  
**Invoice To:** \_\_\_\_\_ :  
**Address:** \_\_\_\_\_  
**City / St. / Zip** \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
**Phone / Fax** \_\_\_\_\_ / \_\_\_\_\_  
**Contact** \_\_\_\_\_



Columbia  
Analytical  
Laboratories, Inc.

4265 Augusta Road, Suite G  
Lexington, South Carolina 29073  
(803) 957-6608, Fax: 957-6912

5 GI      FC/TC      NH<sub>4</sub>      TKN      Phel      Other Ammon for Acid wt.  
 O/G      BNA      TPO<sub>4</sub>      TOC      VOC/Sample      Other ~~Ammon~~ Cond for Plu #1  
 6 Metals      CN      NO<sub>3</sub>      COD      GRA/B      Other  
 Man Hours \_\_\_\_\_  
 Mileage \_\_\_\_\_  
 Hotel & Meals \_\_\_\_\_

Were Samples Received in Ice?(circle) Yes No						Comments:
Relinquished by <i>John S. Smith</i>	Date 10-23-92	Time 4:56	Received by:	Date	Time	
Relinquished by	Date	Time	Received by:	Date	Time	
Relinquished by	Date	Time	Received by C.A.L. <i>Chancan</i>	Date 10-23-92	Time 4:56 pm	



# Columbia Analytical Laboratories, inc.

4265 Augusta Highway, Suite G □ Lexington, SC 29073

## Laboratory Report

(803)957-6608 FAX(803)957-6912

DATE: November 17, 1992

LAB# : 921026-16  
JOB# : 00189

### REPORT OF: GROUNDWATER MONITORING WELL ANALYSIS

CLIENT: KINGS LABORATORY, INC.  
POST OFFICE BOX 120  
BLYTHEWOOD SC 29016

Samples were received by Columbia Analytical Laboratories, Inc. on 10/26/92, at 03:05 pm, and were collected using proper EPA protocol. Testing was conducted at the locations(s) enumerated at the end of this report.

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
A	MW #1	BARIUM (FLAA/EPA 208.1)	0.5	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	19	umhos/cm <sup>3</sup>	C1
		CHROMIUM	<0.05	ppm	C2
		FIELD PH	5.5	std.units	C5
		MERCURY	<0.0002	ppm	C2
		LEAD (FURNACE EPA - 239.2)	<0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	<0.005	ppm	C2
		TOTAL DISSOLVED SOLIDS	9	ppm	C1
		TOTAL ORGANIC CARBON	<1.0	ppm	C1
		WATER LEVEL ELEVATION	506.97	feet	C5
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	4:14am	10-29-92	C3
		p-ISOPROPYL TOLUENE	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFLUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3
		1,2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXACHLOROBUTADIENE	<5	ppb	C3

This report is continued on the next page....

continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3
		1,1-DICHLOROPROPENE	<5	ppb	C3
		1,3-DICHLOROPROPANE	<5	ppb	C3
		2,2-DICHLOROPROPANE	<5	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<5	ppb	C3
		1,2,3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYLBENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1,3-DICHLOROBENZENE	<5	ppb	C3
		1,2-DICHLOROBENZENE	<5	ppb	C3
		1,4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1,1-DICHLOROETHENE	<5	ppb	C3
		1,1-DICHLOROETHANE	<5	ppb	C3
		trans-1,2-DICHLOROETHENE	<5	ppb	C3
		1,2-DICHLOROETHANE	<5	ppb	C3
		1,1,1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1,2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1,1,2-TRICHLOROETHANE	<5	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3

This report is continued on the next page....

continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	<10.0	ppb	GE
		2,4- DINITROPHENOL	<45.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<10.0	ppb	GE
		2,4- DICHLOROPHENOL	<10.0	ppb	GE
		2,4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	<10.0	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAACLOROPHENE	<22.1	ppb	GE
B	MW #2	BARIUM (FLAA/EPA 208.1)	0.5	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	1935	umhos/cm <sup>3</sup>	C1
		CHROMIUM	<0.05	ppm	C2
		FIELD PH	4.8	std.units	C5
		MERCURY	0.0042	ppm	C2
		GC/MS LIBRARY SEARCH	yes		GE
		LEAD (FURNACE EPA - 239.2)	<0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	0.065	ppm	C2
		TOTAL DISSOLVED SOLIDS	2096	ppm	C1
		TOTAL ORGANIC CARBON	12	ppm	C1
		WATER LEVEL ELEVATION	506.49	feet	C5
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	22.6	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	22.9	ppb	GE

This report is continued on the next page....

continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		2, 4- DINITROPHENOL	<45.0	ppb	GE
		2, 4, 6- TRICHLOROPHENOL	<10.0	ppb	GE
		2, 4- DICHLOROPHENOL	<10.0	ppb	GE
		2, 4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	10.5	ppb	GE
		2, 3, 4, 6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2, 6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4, 6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAACLOROPHENE	<22.1	ppb	GE
		APPENDIX 9 VOCs (SW 846 8240)	.		GE
		1, 1, 1, 2-TETRACHLOROETHANE	<2.00	ppb	GE
		1, 1, 1-TRICHLOROETHANE	5.20	ppb	GE
		1, 1, 2, 2-TETRACHLOROETHANE	<2.00	ppb	GE
		1, 1, 2-TRICHLOROETHANE	10.6	ppb	GE
		1, 1-DICHLOROETHANE	<2.00	ppb	GE
		1, 1-DICHLOROETHYLENE	<2.00	ppb	GE
		1, 2, 3-TRICHLOROPROPANE	<20.0	ppb	GE
		1, 2-DIBROMO-3-CHLOROPROPANE	<2.00	ppb	GE
		1, 2-DIBROMOETHANE	<20.0	ppb	GE
		1, 2-DICHLOROETHANE	<2.00	ppb	GE
		1, 2-DICHLOROPROPANE	<2.00	ppb	GE
		1, 2-TRANS-DICHLOROETHYLENE	<2.00	ppb	GE
		2-BUTANONE (METHYL ETHYL KET)	<10.0	ppb	GE
		2-HEXANONE	<2.00	ppb	GE
		4-METHYL-2-PENTANONE	<2.00	ppb	GE
		ACETONE	17.5	ppb	GE
		ACETONITRILE	<2.00	ppb	GE
		ACROLEIN	<20.0	ppb	GE
		ACRYLONITRILE	<20.0	ppb	GE
		ALLYL CHLORIDE	<50.0	ppb	GE
		BENZENE	10.9	ppb	GE
		BROMOFORM	9.90	ppb	GE
		CARBON DISULFIDE	<2.00	ppb	GE
		CARBON TETRACHLORIDE	11.8	ppb	GE
		CHLOROBENZENE	6.10	ppb	GE
		CHLORODIBROMOMETHANE	<2.00	ppb	GE
		CHLOROETHANE	<2.00	ppb	GE
		CHLOROFORM	52.4	ppb	GE
		CHLOROPRENE	<200	ppb	GE
		DIBROMOMETHANE	<2.00	ppb	GE

This report is continued on the next page....

continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
C	MW #3	DICHLOROBROMOMETHANE	<2.00	ppb	GE
		DICHLORODIFLUOROMETHANE	<2.00	ppb	GE
		ETHYL BENZENE	<2.00	ppb	GE
		ISOBUTYL ALCOHOL	<100	ppb	GE
		METHACRYLONITRILE	<50.0	ppb	GE
		METHYL BROMIDE (BROMOMETHANE)	<2.00	ppb	GE
		METHYL CHLORIDE (CHLOROMETHANE)	<2.00	ppb	GE
		METHYL IODIDE	<15.0	ppb	GE
		METHYLENE CHLORIDE	3570	ppb	GE
		PROPIONITRILE	<200	ppb	GE
		STYRENE	<2.00	ppb	GE
		TETRACHLOROETHYLENE	<2.00	ppb	GE
		TOLUENE	14.8	ppb	GE
		TRICHLOROETHYLENE	1610	ppb	GE
		TRICHLOROFLUOROMETHANE	<2.00	ppb	GE
		VINYL ACETATE	<2.00	ppb	GE
		VINYL CHORIDE	<2.00	ppb	GE
		XYLENES	<4.00	ppb	GE
		BIS-2-CHLOROMETHYLETHYL ETHER	<10.0	ppb	GE
		CIS-1,3-DICHLOROPROPYLENE	<2.00	ppb	GE
		TRANS-1,3-DICHLOROPROPYLENE	<2.00	ppb	GE
		TRANS-1,4-DICHLORO-2-BUTENE	<30.0	ppb	GE
		BARIUM (FLAA/EPA 208.1)	0.1	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	100	umhos/cm <sup>3</sup>	C1
		CHROMIUM	<0.05	ppm	C2
		FIELD PH	5.3	std.units	C5
		MERCURY	0.0035	ppm	C2
		LEAD (FURNACE EPA - 239.2)	<0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	<0.005	ppm	C2
		TOTAL DISSOLVED SOLIDS	604	ppm	C1
		TOTAL ORGANIC CARBON	<1.0	ppm	C1
		WATER LEVEL ELEVATION	506.42	feet	C5
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	6:35pm	10-28-92	C3
		p-ISOPROPYLtoluene	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFLUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3

This report is continued on the next page....

Continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		1, 2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXACHLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1, 2, 4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1, 2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3
		1, 1-DICHLOROPROPENE	<5	ppb	C3
		1, 3-DICHLOROPROPANE	<5	ppb	C3
		2, 2-DICHLOROPROPANE	<5	ppb	C3
		1, 2, 4-TRIMETHYLBENZENE	<5	ppb	C3
		1, 2, 3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1, 3, 5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYLBENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1, 2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	7	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1, 3-DICHLOROBENZENE	<5	ppb	C3
		1, 2-DICHLOROBENZENE	<5	ppb	C3
		1, 4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1, 1-DICHLOROETHENE	<5	ppb	C3
		1, 1-DICHLOROETHANE	<5	ppb	C3
		trans-1, 2-DICHLOROETHENE	<5	ppb	C3
		1, 2-DICHLOROETHANE	<5	ppb	C3
		1, 1, 1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	31	ppb	C3
		1, 2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1, 1, 2-TRICHLOROETHANE	<5	ppb	C3
		1, 1, 1, 2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1, 1, 2, 2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3

This report is continued on the next page....

Continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
D	MW #4	BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	<10.0	ppb	GE
		2,4- DINITROPHENOL	<45.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<10.0	ppb	GE
		2,4- DICHLOROPHENOL	<10.0	ppb	GE
		2,4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	<10.0	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAACLOROPHENE	<22.1	ppb	GE
		BARIUM (FLAA/EPA 208.1)	0.3	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	2770	umhos/cm <sup>3</sup>	C1
		CHROMIUM	0.05	ppm	C2
		FIELD PH	4.5	std.units	C5
		MERCURY	<0.0002	ppm	C2
		GC/MS LIBRARY SEARCH	yes		GE
		LEAD (FURNACE EPA - 239.2)	<0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	0.036	ppm	C2
		TOTAL DISSOLVED SOLIDS	1818	ppm	C1
		TOTAL ORGANIC CARBON	88	ppm	C1
		WATER LEVEL ELEVATION	506.39	feet	C5
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE

This report is continued on the next page....

continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		O-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	119	ppb	GE
		2,4- DINITROPHENOL	<45.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<10.0	ppb	GE
		2,4- DICHLOROPHENOL	<10.0	ppb	GE
		2,4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	115	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	32.6	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAACLOROPHENE	<22.1	ppb	GE
		APPENDIX 9 VOCs (SW 846 8240)	.		GE
		1,1,1,2-TETRACHLOROETHANE	<500	ppb	GE
		1,1,1-TRICHLOROETHANE	<500	ppb	GE
		1,1,2,2-TETRACHLOROETHANE	<500	ppb	GE
		1,1,2-TRICHLOROETHANE	<500	ppb	GE
		1,1-DICHLOROETHANE	<500	ppb	GE
		1,1-DICHLOROETHYLENE	<500	ppb	GE
		1,2,3-TRICHLOROPROPANE	<5000	ppb	GE
		1,2-DIBROMO-3-CHLOROPROPANE	<500	ppb	GE
		1,2-DIBROMOETHANE	<5000	ppb	GE
		1,2-DICHLOROETHANE	<500	ppb	GE
		1,2-DICHLOROPROPANE	<500	ppb	GE
		1,2-TRANS-DICHLOROETHYLENE	<500	ppb	GE
		2-BUTANONE (METHYL ETHYL KET)	<2500	ppb	GE
		2-HEXANONE	<500	ppb	GE
		4-METHYL-2-PENTANONE	<500	ppb	GE
		ACETONE	8450	ppb	GE
		ACETONITRILE	<500	ppb	GE
		ACROLEIN	<5000	ppb	GE
		ACRYLONITRILE	<5000	ppb	GE
		ALLYL CHLORIDE	<12500	ppb	GE
		BENZENE	<500	ppb	GE
		BROMOFORM	<500	ppb	GE
		CARBON DISULFIDE	<500	ppb	GE
		CARBON TETRACHLORIDE	<500	ppb	GE
		CHLOROBENZENE	<500	ppb	GE
		CHLORODIBROMOMETHANE	<500	ppb	GE

This report is continued on the next page....

continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
E	MW #5	CHLOROETHANE	<500	ppb	GE
		CHLOROFORM	1250	ppb	GE
		CHLOROPRENE	<50000	ppb	GE
		DIBROMOMETHANE	<500	ppb	GE
		DICHLOROBROMOMETHANE	<500	ppb	GE
		DICHLORODIFLUOROMETHANE	<500	ppb	GE
		ETHYL BENZENE	<500	ppb	GE
		ISOBUTYL ALCOHOL	<25000	ppb	GE
		METHACRYLONITRILE	<12500	ppb	GE
		METHYL BROMIDE (BROMOMETHANE)	<500	ppb	GE
		METHYL CHLORIDE (CHLOROMETHAN)	<500	ppb	GE
		METHYL IODIDE	<3750	ppb	GE
		METHYLENE CHLORIDE	4280	ppb	GE
		PROPIONITRILE	<50000	ppb	GE
		STYRENE	<500	ppb	GE
		TETRACHLOROETHYLENE	<500	ppb	GE
		TOLUENE	<500	ppb	GE
		TRICHLOROETHYLENE	2350	ppb	GE
		TRICHLOROFLUOROMETHANE	<500	ppb	GE
		VINYL ACETATE	<500	ppb	GE
		VINYL CHORIDE	<500	ppb	GE
		XYLENES	<1000	ppb	GE
		BIS-2-CHLOROMETHYLETHYL ETHER	<2500	ppb	GE
		CIS-1,3-DICHLOROPROPYLENE	<500	ppb	GE
		TRANS-1,3-DICHLOROPROPYLENE	<500	ppb	GE
		TRANS-1,4-DICHLORO-2-BUTENE	<7500	ppb	GE
		BARIUM (FLAA/EPA 208.1)	0.3	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	75	umhos/cm <sup>3</sup>	C1
		CHROMIUM	0.06	ppm	C2
		FIELD PH	4.9	std.units	C5
		MERCURY	<0.0002	ppm	C2
		LEAD (FURNACE EPA - 239.2)	<0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	<0.005	ppm	C2
		TOTAL DISSOLVED SOLIDS	59	ppm	C1
		TOTAL ORGANIC CARBON	<1.0	ppm	C1
		WATER LEVEL ELEVATION	24.48 <sup>1</sup>	feet	C5
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	8:00pm	10-28-92	C3
		p-ISOPROPYL TOLUENE	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3

This report is continued on the next page....

continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFLUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3
		1,2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	74	ppb	C3
		HEXACHLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3
		1,1-DICHLOROPROPENE	<5	ppb	C3
		1,3-DICHLOROPROPANE	<5	ppb	C3
		2,2-DICHLOROPROPANE	<5	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<5	ppb	C3
		1,2,3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYLBENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	157	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	76	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1,3-DICHLOROBENZENE	<5	ppb	C3
		1,2-DICHLOROBENZENE	10	ppb	C3
		1,4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1,1-DICHLOROETHENE	<5	ppb	C3
		1,1-DICHLOROETHANE	<5	ppb	C3
		trans-1,2-DICHLOROETHENE	<5	ppb	C3
		1,2-DICHLOROETHANE	<5	ppb	C3
		1,1,1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1,2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	86	ppb	C3
		1,1,2-TRICHLOROETHANE	<5	ppb	C3

This report is continued on the next page....

Continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
F	MW #6	1,1,1,2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	10	ppb	C3
		TOLUENE	8	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.	GE	
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	<10.0	ppb	GE
		2,4- DINITROPHENOL	<45.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<10.0	ppb	GE
		2,4- DICHLOROPHENOL	<10.0	ppb	GE
		2,4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	<10.0	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAACLOROPHENE	<22.1	ppb	GE
		BARIUM (FLAA/EPA 208.1)	0.2	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	1238	umhos/cm <sup>3</sup>	C1
		CHROMIUM	0.05	ppm	C2
		FIELD PH	4.7	std. units	C5
		MERCURY	0.0002	ppm	C2
		LEAD (FURNACE EPA - 239.2)	<0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	0.022	ppm	C2
		TOTAL DISSOLVED SOLIDS	1311	ppm	C1
		TOTAL ORGANIC CARBON	<1.0	ppm	C1
		WATER LEVEL ELEVATION	703.7	feet	C5

This report is continued on the next page....

Continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		VOLATILES (SW 846 8260)	.		
		DATE OF ANALYSIS	2:48am	10-31-92	C3
		p-ISOPROPYL TOLUENE	<500	ppb	C3
		CYCLOHEXANE	<500	ppb	C3
		CHLOROMETHANE	<500	ppb	C3
		DICHLORODIFLUOROMETHANE	<500	ppb	C3
		BROMOMETHANE	<500	ppb	C3
		CHLOROETHANE	<500	ppb	C3
		TRICHLOROFUOROMETHANE	<500	ppb	C3
		trans-1,3-DICHLOROPROPENE	<500	ppb	C3
		cis-1,3-DICHLOROPROPENE	<500	ppb	C3
		1,2-DIBROMOETHANE	<500	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<500	ppb	C3
		ACETONE	<5000	ppb	C3
		HEXA-CHLOROBUTADIENE	<500	ppb	C3
		METHYL ETHYL KETONE	<2500	ppb	C3
		NAPHTHALENE	<500	ppb	C3
		1,2,4-TRICHLOROBENZENE	<500	ppb	C3
		cis-1,2-DICHLOROETHENE	<500	ppb	C3
		DIBROMOMETHANE	<500	ppb	C3
		1,1-DICHLOROPROPENE	<500	ppb	C3
		1,3-DICHLOROPROPANE	<500	ppb	C3
		2,2-DICHLOROPROPANE	<500	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<500	ppb	C3
		1,2,3-TRICHLOROBENZENE	<500	ppb	C3
		n-BUTYL BENZENE	<500	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<500	ppb	C3
		tert-BUTYL BENZENE	<500	ppb	C3
		sec-BUTYL BENZENE	<500	ppb	C3
		BROMOCHLOROMETHANE	<500	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<500	ppb	C3
		CHLOROFORM	<500	ppb	C3
		BROMOFORM	<500	ppb	C3
		BROMODICHLOROMETHANE	<500	ppb	C3
		DIBROMOCHLOROMETHANE	<500	ppb	C3
		METHYLENE CHLORIDE	1240	ppb	C3
		2-CHLOROTOLUENE	<500	ppb	C3
		4-CHLOROTOLUENE	<500	ppb	C3
		1,3-DICHLOROBENZENE	<500	ppb	C3
		1,2-DICHLOROBENZENE	<500	ppb	C3
		1,4-DICHLOROBENZENE	<500	ppb	C3
		VINYL CHLORIDE	<500	ppb	C3
		1,1-DICHLOROETHENE	<500	ppb	C3
		1,1-DICHLOROETHANE	<500	ppb	C3

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Continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
G	MW #7	trans-1,2-DICHLOROETHENE	<500	ppb	C3
		1,2-DICHLOROETHANE	<500	ppb	C3
		1,1,1-TRICHLOROETHANE	534	ppb	C3
		CARBON TETRACHLORIDE	<500	ppb	C3
		1,2-DICHLOROPROPANE	<500	ppb	C3
		TRICHLOROETHENE	3315	ppb	C3
		1,1,2-TRICHLOROETHANE	<500	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<500	ppb	C3
		TETRACHLOROETHENE	<500	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<500	ppb	C3
		CHLOROBENZENE	<500	ppb	C3
		BENZENE	<500	ppb	C3
		TOLUENE	<500	ppb	C3
		ETHYLBENZENE	<500	ppb	C3
		BROMOBENZENE	<500	ppb	C3
		ISOPROPYLBENZENE	<500	ppb	C3
		STYRENE	<500	ppb	C3
		o-XYLENE	<500	ppb	C3
		n-PROPYLBENZENE	<500	ppb	C3
		p-XYLENE/m-XYLENE	<500	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.	ppb	GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	16.9	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	122	ppb	GE
		2,4- DINITROPHENOL	<45.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<10.0	ppb	GE
		2,4- DICHLOROPHENOL	<10.0	ppb	GE
		2,4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	620	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	23.0	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAICLOROPHENE	<22.1	ppb	GE
		BARIUM (FLAA/EPA 208.1)	0.2	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	760	umhos/cm <sup>3</sup>	C1
		CHROMIUM	<0.05	ppm	C2

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continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		FIELD PH	5.0	std.units	C5
		MERCURY	<0.0002	ppm	C2
		LEAD (FURNACE EPA - 239.2)	<0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	0.005	ppm	C2
		TOTAL DISSOLVED SOLIDS	444	ppm	C1
		TOTAL ORGANIC CARBON	6.5	ppm	C1
		WATER LEVEL ELEVATION	505.94	feet	C5
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	4:12am	10-31-92	C3
		p-ISOPROPYLtoluene	<50	ppb	C3
		CYCLOHEXANE	<50	ppb	C3
		CHLOROMETHANE	<50	ppb	C3
		DICHLORODIFLUOROMETHANE	<50	ppb	C3
		BROMOMETHANE	<50	ppb	C3
		CHLOROETHANE	<50	ppb	C3
		TRICHLOROFUOROMETHANE	<50	ppb	C3
		trans-1,3-DICHLOROPROPENE	<50	ppb	C3
		cis-1,3-DICHLOROPROPENE	<50	ppb	C3
		1,2-DIBROMOETHANE	<50	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<50	ppb	C3
		ACETONE	545	ppb	C3
		HEXAChlorobutadiene	<50	ppb	C3
		METHYL ETHYL KETONE	<250	ppb	C3
		NAPHTHALENE	<50	ppb	C3
		1,2,4-TRICHLOROBENZENE	<50	ppb	C3
		cis-1,2-DICHLOROETHENE	<50	ppb	C3
		DIBROMOMETHANE	<50	ppb	C3
		1,1-DICHLOROPROPENE	<50	ppb	C3
		1,3-DICHLOROPROPANE	<50	ppb	C3
		2,2-DICHLOROPROPANE	<50	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<50	ppb	C3
		1,2,3-TRICHLOROBENZENE	<50	ppb	C3
		n-BUTYLBENZENE	<50	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<50	ppb	C3
		tert-BUTYLBENZENE	<50	ppb	C3
		sec-BUTYL BENZENE	<50	ppb	C3
		BROMOCHLOROMETHANE	<50	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<50	ppb	C3
		CHLOROFORM	296	ppb	C3
		BROMOFORM	121	ppb	C3
		BROMODICHLOROMETHANE	<50	ppb	C3
		DIBROMOCHLOROMETHANE	<50	ppb	C3
		METHYLENE CHLORIDE	575	ppb	C3
		2-CHLORTOLUENE	<50	ppb	C3

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continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		4-CHLOROTOLUENE	<50	ppb	C3
		1, 3-DICHLOROBENZENE	<50	ppb	C3
		1, 2-DICHLOROBENZENE	147	ppb	C3
		1, 4-DICHLOROBENZENE	<50	ppb	C3
		VINYL CHLORIDE	<50	ppb	C3
		1, 1-DICHLOROETHENE	<50	ppb	C3
		1, 1-DICHLOROETHANE	<50	ppb	C3
		trans-1, 2-DICHLOROETHENE	<50	ppb	C3
		1, 2-DICHLOROETHANE	<50	ppb	C3
		1, 1, 1-TRICHLOROETHANE	53	ppb	C3
		CARBON TETRACHLORIDE	<50	ppb	C3
		1, 2-DICHLOROPROPANE	<50	ppb	C3
		TRICHLOROETHENE	1881	ppb	C3
		1, 1, 2-TRICHLOROETHANE	<50	ppb	C3
		1, 1, 1, 2-TETRACHLOROETHANE	<50	ppb	C3
		TETRACHLOROETHENE	<50	ppb	C3
		1, 1, 2, 2-TETRACHLOROETHANE	<50	ppb	C3
		CHLOROBENZENE	<50	ppb	C3
		BENZENE	<50	ppb	C3
		TOLUENE	<50	ppb	C3
		ETHYLBENZENE	<50	ppb	C3
		BROMOBENZENE	<50	ppb	C3
		ISOPROPYLBENZENE	<50	ppb	C3
		STYRENE	<50	ppb	C3
		o-XYLENE	<50	ppb	C3
		n-PROPYLBENZENE	<50	ppb	C3
		p-XYLENE/m-XYLENE	<50	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4, 6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2, 4, 5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	28.0	ppb	GE
		2, 4- DINITROPHENOL	<45.0	ppb	GE
		2, 4, 6- TRICHLOROPHENOL	<10.0	ppb	GE
		2, 4- DICHLOROPHENOL	<10.0	ppb	GE
		2, 4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<61.8	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	<10.0	ppb	GE
		2, 3, 4, 6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2, 6- DICHLOROPHENOL	<10.0	ppb	GE

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**CONTINUATION OF REPORT OF GROUNDWATER MONITORING WELL ANALYSIS**

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continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
I	FIELD BLAN	VINYL CHLORIDE	<5	ppb	C3
		1,1-DICHLOROETHENE	<5	ppb	C3
		1,1-DICHLOROETHANE	<5	ppb	C3
		trans-1,2-DICHLOROETHENE	<5	ppb	C3
		1,2-DICHLOROETHANE	<5	ppb	C3
		1,1,1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1,2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1,1,2-TRICHLOROETHANE	<5	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	5:10pm	10-28-92	C3
		p-ISOPROPYLtolUENE	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3
		1,2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXACHLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3
		1,1-DICHLOROPROPENE	<5	ppb	C3

This report is continued on the next page....

Continuation of report of GROUNDWATER MONITORING WELL ANALYSIS

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		1, 3-DICHLOROPROPANE	<5	ppb	C3
		2, 2-DICHLOROPROPANE	<5	ppb	C3
		1, 2, 4-TRIMETHYLBENZENE	<5	ppb	C3
		1, 2, 3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1, 3, 5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYLBENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1, 2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1, 3-DICHLOROBENZENE	<5	ppb	C3
		1, 2-DICHLOROBENZENE	<5	ppb	C3
		1, 4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1, 1-DICHLOROETHENE	<5	ppb	C3
		1, 1-DICHLOROETHANE	<5	ppb	C3
		trans-1, 2-DICHLOROETHENE	<5	ppb	C3
		1, 2-DICHLOROETHANE	<5	ppb	C3
		1, 1, 1-TRICHLOROETHANE	5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1, 2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1, 1, 2-TRICHLOROETHANE	<5	ppb	C3
		1, 1, 1, 2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1, 1, 2, 2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3

ID LABORATORY TEST LOCATION NUMBER  
C1= Columbia-inorganics 32114  
C3= Columbia-organics 32114  
S= Lab Certification # 10120

ID LABORATORY TEST LOCATION NUMBER  
C2= Columbia-metals 32114  
C5= Columbia-field 32114



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LAB#: 921026-16

**GROUNDWATER MONITORING WELL ANALYSIS**

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Respectfully submitted,  
Columbia Analytical Laboratories, Inc.

774  
Mark W. Gilbert  
Project Director



# GENERAL ENGINEERING LABORATORIES

Environmental Engineering and Analytical Services

Molly F. Greene  
President

George C. Greene, P.E., Ph.D.  
Vice President  
SC Registration No. 9103

Laboratory Certifications:	
FL	E87156/87294
NC	233
SC	10120
VA	00151
TN	02934
WI	99988779

November 16, 1992

Mr. Mark Gilbert  
Columbia Analytical, Inc.  
4265 Augusta Highway  
Lexington, SC 29072

Re: 10 Highest peaks for our sample ID's # 9210491-15 and -16

Dear Mr. Gilbert:

In response to the referenced sample number, the samples were screened for the 10 highest peaks for each volatile organic fraction as requested. It is often difficult to distinguish between the various possibilities by using a simple mass spectral library search. Positive identification would require the use of pure substance standards for the purpose of comparing gas chromatographic retention times and mass spectra. Consequently, the identifications presented below must be considered as tentatively identified compounds. Also the number for the Probability Base Matching(PBM) is a percentage based on the mass spectral library search of over 48,000 compounds.

<u>Identification(TIC)</u>	<u>Estimated Concentration</u>	<u>PBM</u>
<b>Sample ID # 9210491-15:</b>		
Unknown	19 ppb	N/A
2-ethyl-hexanal	3 ppb	89%
Unknown	4 ppb	N/A
Unknown hydrocarbon	4 ppb	N/A
Methylthiobenzene	7 ppb	94%
Unknown hydrocarbon	3 ppb	N/A

**Sample ID # 9210491-16:**

No Tentative Identified Compounds were found.

Thank you for allowing our firm to assist you with this project. If you have any questions, feel free to call me or I will be happy to let you discuss the review with Linda Darrington, QA/QC Officer.

Yours very truly,

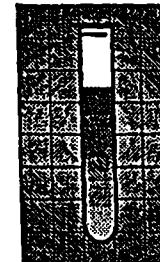
*Cherie Pittillo for Terri Fitzgerald*

Terri Fitzgerald  
Project Manager

coan00191.111692

## CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Name Quarterly GW/SURFACE WATER/RUNOFF ANALYSIS Job # 189  
 Co. Name Kings Laboratory, Inc. Contact \_\_\_\_\_  
 Address P.O. Box 120 City, St, Zip Blythewood, SC 29016  
 Phone \_\_\_\_\_ Sampler(s) RGB  
 Fax Service Requested:  YES  NO Fax No. \_\_\_\_\_



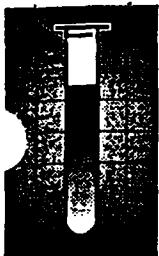
Columbia  
Analytical  
Laboratories, inc.

4265 Augusta Highway, Suite G  
Lexington, South Carolina 29072  
(803) 957-6608, Fax: 957-6912

													Tests Required									
		Station Number	Date	Time Collected	Composite	GRAB	# of Containers	NPDES	SDWA	RCRA	Other	Soil	Liquid	Solid Waste	Field PH	Conductivity	Water Level	Inorganics	F/P	F/P	F/P	—{ F:Filtered, P:Preserved }
<input checked="" type="checkbox"/> Samples were maintained at 4°C																						
Sample Location		MW 1	A	10/26/92	10:25	4		X			X											LABORATORY TESTS: ALL ARE GRAB
MW 2		B	"	1:01	4			X			X											CN,Cr,Hg,Pb,TDS,TOC,Se,Sa
MW 3		C	"	10:52	4			X			X											+ VOCs (8260), acid ext.
MW 4		D	"	1:24	4			X			X											FIELD TESTS: ALL ARE GRAB
MW 5		E	"	12:04	4			X			X											COND,FDH,WL
MW 6		F	"	12:32	4			X			X											
MW 7		G	"	11:23	4			X			X											
Trip Blank		H																				<del>8260</del> Volatiles
Field Blank		I																				
Relinquished by:		Date	Time	Received by:	Date	Time	Comments															
<i>Jay B</i>		10/26/92	2:20																			
Relinquished by:		Date	Time	Received by:	Date	Time																
Received by C.A.L.		Date	Time	FOR OFFICE USE ONLY																		
<i>Elvance</i>		10-2-92	3:15 PM	M		PM																

Please see attached list.

MW 2 & 4 - Appendix 9 Volatiles  
+ Library Scan



# Columbia Analytical Laboratories, inc.

4265 Augusta Highway, Suite G □ Lexington, SC 29073

# Laboratory Report

(803)957-6608 FAX(803)957-6912

DATE: November 17, 1992

LAB# : 921028-09  
JOB# : 00189

**REPORT OF: PBS & J SITE SURVEY PROJECT**

CLIENT: KINGS LABORATORY, INC.  
POST OFFICE BOX 120  
BLYTHEWOOD SC 29016

Samples were received by Columbia Analytical Laboratories, Inc. on 10/28/92, at 10:58 am, and were collected using proper EPA protocol. Testing was conducted at the locations(s) enumerated at the end of this report.

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
A	SW-7	BARIUM (FLAA/EPA 208.1)	0.1	ppm	C2
		TOTAL CYANIDE (EPA 335.1)	<0.01	ppm	C1
		CHROMIUM (FLAA/EPA 218.1)	<0.05	ppm	C2
		MERCURY	<0.0002	ppm	C2
		LEAD (GFAA/EPA 239.2)	<0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	<0.005	ppm	C2
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	1:35am	10-29-92	C3
		p-ISOPROPYLtolUENE	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFLUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3
		1,2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXACHLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3
		DIBROMOMETHANE	<5	ppb	C3

"this report is continued on the next page....

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		1, 1-DICHLOROPROPENE	<5	ppb	C3
		1, 3-DICHLOROPROPANE	<5	ppb	C3
		2, 2-DICHLOROPROPANE	<5	ppb	C3
		1, 2, 4-TRIMETHYLBENZENE	<5	ppb	C3
		1, 2, 3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1, 3, 5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYLBENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1, 2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1, 3-DICHLOROBENZENE	<5	ppb	C3
		1, 2-DICHLOROBENZENE	<5	ppb	C3
		1, 4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1, 1-DICHLOROETHENE	<5	ppb	C3
		1, 1-DICHLOROETHANE	<5	ppb	C3
		trans-1, 2-DICHLOROETHENE	<5	ppb	C3
		1, 2-DICHLOROETHANE	<5	ppb	C3
		1, 1, 1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1, 2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1, 1, 2-TRICHLOROETHANE	<5	ppb	C3
		1, 1, 1, 2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1, 1, 2, 2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3
		p-XYLENE/m-XYLENE	<5	ppb	C3

This report is continued on the next page....

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
B	CS-02/03	APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	<10.0	ppb	GE
		2,4- DINITROPHENOL	<45.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<10	ppb	GE
		2,4- DICHLOROPHENOL	<10.0	ppb	GE
		2,4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	<10.0	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAACLOROPHENE	<22.1	ppb	GE
		BARIUM (FLAA/EPA 208.1)	76	ppm	C2
		CHROMIUM (FLAA/EPA 218.1)	13	ppm	C2
		MERCURY	0.2	ppm	C2
		LEAD (GFAA/EPA 239.2)	95	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	0.07	ppm	C2
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	12:44pm	10-30-92	C3
		p-ISOPROPYL TOLUENE	<100	ppb	C3
		CYCLOHEXANE	<100	ppb	C3
		CHLOROMETHANE	<100	ppb	C3
		DICHLORODIFLUOROMETHANE	<100	ppb	C3
		BROMOMETHANE	<100	ppb	C3
		CHLOROETHANE	<100	ppb	C3
		TRICHLOROFUOROMETHANE	<100	ppb	C3
		trans-1,3-DICHLOROPROPENE	<100	ppb	C3
		cis-1,3-DICHLOROPROPENE	<100	ppb	C3
		1,2-DIBROMOETHANE	<100	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<100	ppb	C3
		ACETONE	<1000	ppb	C3
		HEXAACLOROBUTADIENE	<100	ppb	C3
		METHYL ETHYL KETONE	<500	ppb	C3
		NAPHTHALENE	<100	ppb	C3
		1,2,4-TRICHLOROBENZENE	<100	ppb	C3
		cis-1,2-DICHLOROETHENE	<100	ppb	C3

This report is continued on the next page....

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		DIBROMOMETHANE	<100	ppb	C3
		1,1-DICHLOROPROPENE	<100	ppb	C3
		1,3-DICHLOROPROPANE	<100	ppb	C3
		2,2-DICHLOROPROPANE	<100	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<100	ppb	C3
		1,2,3-TRICHLOROBENZENE	<100	ppb	C3
		n-BUTYLBENZENE	<100	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<100	ppb	C3
		tert-BUTYLBENZENE	<100	ppb	C3
		sec-BUTYL BENZENE	<100	ppb	C3
		BROMOCHLOROMETHANE	<100	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<100	ppb	C3
		CHLOROFORM	<100	ppb	C3
		BROMOFORM	<100	ppb	C3
		BROMODICHLOROMETHANE	<100	ppb	C3
		DIBROMOCHLOROMETHANE	<100	ppb	C3
		METHYLENE CHLORIDE	<100	ppb	C3
		2-CHLOROTOLUENE	<100	ppb	C3
		4-CHLOROTOLUENE	<100	ppb	C3
		1,3-DICHLOROBENZENE	<100	ppb	C3
		1,2-DICHLOROBENZENE	<100	ppb	C3
		1,4-DICHLOROBENZENE	<100	ppb	C3
		VINYL CHLORIDE	<100	ppb	C3
		1,1-DICHLOROETHENE	<100	ppb	C3
		1,1-DICHLOROETHANE	<100	ppb	C3
		trans-1,2-DICHLOROETHENE	<100	ppb	C3
		1,2-DICHLOROETHANE	<100	ppb	C3
		1,1,1-TRICHLOROETHANE	<100	ppb	C3
		CARBON TETRACHLORIDE	<100	ppb	C3
		1,2-DICHLOROPROPANE	<100	ppb	C3
		TRICHLOROETHENE	151	ppb	C3
		1,1,2-TRICHLOROETHANE	<100	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<100	ppb	C3
		TETRACHLOROETHENE	<100	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<100	ppb	C3
		CHLOROBENZENE	<100	ppb	C3
		BENZENE	<100	ppb	C3
		TOLUENE	<100	ppb	C3
		ETHYLBENZENE	<100	ppb	C3
		BROMOBENZENE	<100	ppb	C3
		ISOPROPYLBENZENE	<100	ppb	C3
		STYRENE	<100	ppb	C3
		o-XYLENE	<100	ppb	C3
		n-PROPYLBENZENE	<100	ppb	C3

This report is continued on the next page....

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
C	SS-04	p-XYLENE/m-XYLENE	<100	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.	ppb	GE
		m-CRESOL	<3330	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<1670	ppb	GE
		o-CRESOL	<1670	ppb	GE
		p-CRESOL	<1670	ppb	GE
		TRICHLOROPHENOL	<1670	ppb	GE
		PENTACHLOROPHENOL	1670	ppb	GE
		2,4- DINITROPHENOL	<3330	ppb	GE
		2,4,6- TRICHLOROPHENOL	<1670	ppb	GE
		2,4- DICHLOROPHENOL	<1670	ppb	GE
		2,4- DIMETHYLPHENOL	<1670	ppb	GE
		2-NITROPHENOL	<1670	ppb	GE
		4-NITROPHENOL	<31600	ppb	GE
		2- CHLOROPHENOL	<1670	ppb	GE
		PHENOLS	<1670	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<3900	ppb	GE
		2,6- DICHLOROPHENOL	<3600	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<4500	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<1670	ppb	GE
		HEXAChlorophene	<12300	ppb	GE
		BARIUM (FLAA/EPA 208.1)	6	ppm	C2
		CHROMIUM (FLAA/EPA 218.1)	3.3	ppm	C2
		MERCURY	0.13	ppm	C2
		LEAD (GFAA/EPA 239.2)	41	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	0.09	ppm	C2
		VOLATILES (SW 846 8260)	.	ppm	C3
		DATE OF ANALYSIS	5:01pm	10-30-92	C3
		p-ISOPROPYLtoluene	<100	ppb	C3
		CYCLOHEXANE	<100	ppb	C3
		CHLOROMETHANE	<100	ppb	C3
		DICHLORODIFLUOROMETHANE	<100	ppb	C3
		BROMOMETHANE	<100	ppb	C3
		CHLOROETHANE	<100	ppb	C3
		TRICHLOROFUOROMETHANE	<100	ppb	C3
		trans-1,3-DICHLOROPROPENE	<100	ppb	C3
		cis-1,3-DICHLOROPROPENE	<100	ppb	C3
		1,2-DIBROMOETHANE	<100	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<100	ppb	C3
		ACETONE	<1000	ppb	C3
		HEXACHLOROBUTADIENE	<100	ppb	C3
		METHYL ETHYL KETONE	<500	ppb	C3
		NAPHTHALENE	<100	ppb	C3
		1,2,4-TRICHLOROBENZENE	<100	ppb	C3

This report is continued on the next page....

continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		cis-1,2-DICHLOROETHENE	<100	ppb	C3
		DIBROMOMETHANE	<100	ppb	C3
		1,1-DICHLOROPROPENE	<100	ppb	C3
		1,3-DICHLOROPROPANE	<100	ppb	C3
		2,2-DICHLOROPROPANE	<100	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<100	ppb	C3
		1,2,3-TRICHLOROBENZENE	<100	ppb	C3
		n-BUTYLBENZENE	<100	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<100	ppb	C3
		tert-BUTYLBENZENE	<100	ppb	C3
		sec-BUTYL BENZENE	<100	ppb	C3
		BROMOCHLOROMETHANE	<100	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<100	ppb	C3
		CHLOROFORM	<100	ppb	C3
		BROMOFORM	<100	ppb	C3
		BROMODICHLOROMETHANE	<100	ppb	C3
		DIBROMOCHLOROMETHANE	<100	ppb	C3
		METHYLENE CHLORIDE	<100	ppb	C3
		2-CHLOROTOLUENE	<100	ppb	C3
		4-CHLOROTOLUENE	<100	ppb	C3
		1,3-DICHLOROBENZENE	<100	ppb	C3
		1,2-DICHLOROBENZENE	<100	ppb	C3
		1,4-DICHLOROBENZENE	<100	ppb	C3
		VINYL CHLORIDE	<100	ppb	C3
		1,1-DICHLOROETHENE	<100	ppb	C3
		1,1-DICHLOROETHANE	<100	ppb	C3
		trans-1,2-DICHLOROETHENE	<100	ppb	C3
		1,2-DICHLOROETHANE	<100	ppb	C3
		1,1,1-TRICHLOROETHANE	<100	ppb	C3
		CARBON TETRACHLORIDE	<100	ppb	C3
		1,2-DICHLOROPROPANE	<100	ppb	C3
		TRICHLOROETHENE	<100	ppb	C3
		1,1,2-TRICHLOROETHANE	<100	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<100	ppb	C3
		TETRACHLOROETHENE	<100	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<100	ppb	C3
		CHLOROBENZENE	<100	ppb	C3
		BENZENE	<100	ppb	C3
		TOLUENE	<100	ppb	C3
		ETHYLBENZENE	<100	ppb	C3
		BROMOBENZENE	<100	ppb	C3
		ISOPROPYLBENZENE	<100	ppb	C3
		STYRENE	<100	ppb	C3
		o-XYLENE	<100	ppb	C3

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Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
D	SS-05	n-PROPYLBENZENE	<100	ppb	C3
		p-XYLENE/m-XYLENE	<100	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<333	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<1650	ppb	GE
		O-CRESOL	<330	ppb	GE
		p-CRESOL	<330	ppb	GE
		TRICHLOROPHENOL	<330	ppb	GE
		PENTACHLOROPHENOL	<330	ppb	GE
		2,4- DINITROPHENOL	<1490	ppb	GE
		2,4,6- TRICHLOROPHENOL	<330	ppb	GE
		2,4- DICHLOROPHENOL	<330	ppb	GE
		2,4- DIMETHYLPHENOL	<330	ppb	GE
		2-NITROPHENOL	<330	ppb	GE
		4-NITROPHENOL	<3160	ppb	GE
		2- CHLOROPHENOL	<330	ppb	GE
		PHENOLS	<330	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<390	ppb	GE
		2,6- DICHLOROPHENOL	<360	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<450	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<330	ppb	GE
		HEXAACLOROPHENE	<1230	ppb	GE
		BARIUM (FLAA/EPA 208.1)	11	ppm	C2
		CHROMIUM (FLAA/EPA 218.1)	4	ppm	C2
		MERCURY	0.57	ppm	C2
		LEAD (GFAA/EPA 239.2)	14	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	0.06	ppm	C2
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	6:26pm	10-30-92	C3
		p-ISOPROPYL TOLUENE	<100	ppb	C3
		CYCLOHEXANE	<100	ppb	C3
		CHLOROMETHANE	<100	ppb	C3
		DICHLORODIFLUOROMETHANE	<100	ppb	C3
		BROMOMETHANE	<100	ppb	C3
		CHLOROETHANE	<100	ppb	C3
		TRICHLOROFUOROMETHANE	<100	ppb	C3
		trans-1,3-DICHLOROPROPENE	<100	ppb	C3
		cis-1,3-DICHLOROPROPENE	<100	ppb	C3
		1,2-DIBROMOETHANE	<100	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<100	ppb	C3
		ACETONE	<1000	ppb	C3
		HEXAACLOROBUTADIENE	<100	ppb	C3
		METHYL ETHYL KETONE	<500	ppb	C3
		NAPHTHALENE	<100	ppb	C3

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Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		1, 2, 4-TRICHLOROBENZENE	<100	ppb	C3
		cis-1, 2-DICHLOROETHENE	<100	ppb	C3
		DIBROMOMETHANE	<100	ppb	C3
		1, 1-DICHLOROPROPENE	<100	ppb	C3
		1, 3-DICHLOROPROPANE	<100	ppb	C3
		2, 2-DICHLOROPROPANE	<100	ppb	C3
		1, 2, 4-TRIMETHYLBENZENE	<100	ppb	C3
		1, 2, 3-TRICHLOROBENZENE	<100	ppb	C3
		n-BUTYLBENZENE	<100	ppb	C3
		1, 3, 5-TRIMETHYLBENZENE	<100	ppb	C3
		tert-BUTYLBENZENE	<100	ppb	C3
		sec-BUTYL BENZENE	<100	ppb	C3
		BROMOCHLOROMETHANE	<100	ppb	C3
		1, 2-DIBROMO-3-CHLOROPROPANE	<100	ppb	C3
		CHLOROFORM	<100	ppb	C3
		BROMOFORM	<100	ppb	C3
		BROMODICHLOROMETHANE	<100	ppb	C3
		DIBROMOCHLOROMETHANE	<100	ppb	C3
		METHYLENE CHLORIDE	<100	ppb	C3
		2-CHLOROTOLUENE	<100	ppb	C3
		4-CHLOROTOLUENE	<100	ppb	C3
		1, 3-DICHLOROBENZENE	<100	ppb	C3
		1, 2-DICHLOROBENZENE	<100	ppb	C3
		1, 4-DICHLOROBENZENE	<100	ppb	C3
		VINYL CHLORIDE	<100	ppb	C3
		1, 1-DICHLOROETHENE	<100	ppb	C3
		1, 1-DICHLOROETHANE	<100	ppb	C3
		trans-1, 2-DICHLOROETHENE	<100	ppb	C3
		1, 2-DICHLOROETHANE	<100	ppb	C3
		1, 1, 1-TRICHLOROETHANE	<100	ppb	C3
		CARBON TETRACHLORIDE	<100	ppb	C3
		1, 2-DICHLOROPROPANE	<100	ppb	C3
		TRICHLOROETHENE	<100	ppb	C3
		1, 1, 2-TRICHLOROETHANE	<100	ppb	C3
		1, 1, 1, 2-TETRACHLOROETHANE	<100	ppb	C3
		TETRACHLOROETHENE	<100	ppb	C3
		1, 1, 2, 2-TETRACHLOROETHANE	<100	ppb	C3
		CHLOROBENZENE	<100	ppb	C3
		BENZENE	<100	ppb	C3
		TOLUENE	<100	ppb	C3
		ETHYLBENZENE	<100	ppb	C3
		BROMOBENZENE	<100	ppb	C3
		ISOPROPYLBENZENE	<100	ppb	C3
		STYRENE	<100	ppb	C3

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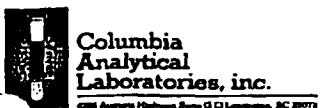
SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
E	SS-07	o-XYLENE	<100	ppb	C3
		n-PROPYLBENZENE	<100	ppb	C3
		p-XYLENE/m-XYLENE	<100	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.	ppb	GE
		m-CRESOL	<333	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<1650	ppb	GE
		o-CRESOL	<330	ppb	GE
		p-CRESOL	<330	ppb	GE
		TRICHLOROPHENOL	<330	ppb	GE
		PENTACHLOROPHENOL	<330	ppb	GE
		2,4- DINITROPHENOL	<1490	ppb	GE
		2,4,6- TRICHLOROPHENOL	<330	ppb	GE
		2,4- DICHLOROPHENOL	<330	ppb	GE
		2,4- DIMETHYLPHENOL	<330	ppb	GE
		2-NITROPHENOL	<330	ppb	GE
		4-NITROPHENOL	<3160	ppb	GE
		2- CHLOROPHENOL	<330	ppb	GE
		PHENOLS	<330	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<390	ppb	GE
		2,6- DICHLOROPHENOL	<360	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<450	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<330	ppb	GE
		HEXAACLOROPHENE	<1230	ppb	GE
		BARIUM (FLAA/EPA 208.1)	9	ppm	C2
		CHROMIUM (FLAA/EPA 218.1)	2.7	ppm	C2
		MERCURY	0.11	ppm	C2
		LEAD (GFAA/EPA 239.2)	18	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	0.05	ppm	C2
		VOLATILES (SW 846 8260)	.	ppb	C3
		DATE OF ANALYSIS	7:50pm	10-30-92	C3
		p-ISOPROPYLtoluene	<100	ppb	C3
		CYCLOHEXANE	<100	ppb	C3
		CHLOROMETHANE	<100	ppb	C3
		DICHLORODIFLUOROMETHANE	<100	ppb	C3
		BROMOMETHANE	<100	ppb	C3
		CHLOROETHANE	<100	ppb	C3
		TRICHLOROFUOROMETHANE	<100	ppb	C3
		trans-1,3-DICHLOROPROPENE	<100	ppb	C3
		cis-1,3-DICHLOROPROPENE	<100	ppb	C3
		1,2-DIBROMOETHANE	<100	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<100	ppb	C3
		ACETONE	<1000	ppb	C3
		HEXAACLOROBUTADIENE	<100	ppb	C3
		METHYL ETHYL KETONE	<500	ppb	C3

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Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		NAPHTHALENE	<100	ppb	C3
		1, 2, 4-TRICHLOROBENZENE	<100	ppb	C3
		cis-1, 2-DICHLOROETHENE	<100	ppb	C3
		DIBROMOMETHANE	<100	ppb	C3
		1, 1-DICHLOROPROPENE	<100	ppb	C3
		1, 3-DICHLOROPROPANE	<100	ppb	C3
		2, 2-DICHLOROPROPANE	<100	ppb	C3
		1, 2, 4-TRIMETHYLBENZENE	<100	ppb	C3
		1, 2, 3-TRICHLOROBENZENE	<100	ppb	C3
		n-BUTYLBENZENE	<100	ppb	C3
		1, 3, 5-TRIMETHYLBENZENE	<100	ppb	C3
		tert-BUTYLBENZENE	<100	ppb	C3
		sec-BUTYL BENZENE	<100	ppb	C3
		BROMOCHLOROMETHANE	<100	ppb	C3
		1, 2-DIBROMO-3-CHLOROPROPANE	<100	ppb	C3
		CHLOROFORM	<100	ppb	C3
		BROMOFORM	<100	ppb	C3
		BROMODICHLOROMETHANE	<100	ppb	C3
		DIBROMOCHLOROMETHANE	<100	ppb	C3
		METHYLENE CHLORIDE	<100	ppb	C3
		2-CHLOROTOLUENE	<100	ppb	C3
		4-CHLOROTOLUENE	<100	ppb	C3
		1, 3-DICHLOROBENZENE	<100	ppb	C3
		1, 2-DICHLOROBENZENE	<100	ppb	C3
		1, 4-DICHLOROBENZENE	<100	ppb	C3
		VINYL CHLORIDE	<100	ppb	C3
		1, 1-DICHLOROETHENE	<100	ppb	C3
		1, 1-DICHLOROETHANE	<100	ppb	C3
		trans-1, 2-DICHLOROETHENE	<100	ppb	C3
		1, 2-DICHLOROETHANE	<100	ppb	C3
		1, 1, 1-TRICHLOROETHANE	<100	ppb	C3
		CARBON TETRACHLORIDE	<100	ppb	C3
		1, 2-DICHLOROPROPANE	<100	ppb	C3
		TRICHLOROETHENE	<100	ppb	C3
		1, 1, 2-TRICHLOROETHANE	<100	ppb	C3
		1, 1, 1, 2-TETRACHLOROETHANE	<100	ppb	C3
		TETRACHLOROETHENE	<100	ppb	C3
		1, 1, 2, 2-TETRACHLOROETHANE	<100	ppb	C3
		CHLOROBENZENE	<100	ppb	C3
		BENZENE	<100	ppb	C3
		TOLUENE	<100	ppb	C3
		ETHYLBENZENE	<100	ppb	C3
		BROMOBENZENE	<100	ppb	C3
		ISOPROPYLBENZENE	<100	ppb	C3

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Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		STYRENE	<100	ppb	C3
		o-XYLENE	<100	ppb	C3
		n-PROPYLBENZENE	<100	ppb	C3
		p-XYLENE/m-XYLENE	<100	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<3330	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<1670	ppb	GE
		o-CRESOL	<1670	ppb	GE
		p-CRESOL	<1670	ppb	GE
		TRICHLOROPHENOL	<1670	ppb	GE
		PENTACHLOROPHENOL	<1670	ppb	GE
		2,4- DINITROPHENOL	<3330	ppb	GE
		2,4,6- TRICHLOROPHENOL	<1670	ppb	GE
		2,4- DICHLOROPHENOL	<1670	ppb	GE
		2,4- DIMETHYLPHENOL	<1670	ppb	GE
		2-NITROPHENOL	<1670	ppb	GE
		4-NITROPHENOL	<31600	ppb	GE
		2- CHLOROPHENOL	<1670	ppb	GE
		PHENOLS	<1670	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<3900	ppb	GE
		2,6- DICHLOROPHENOL	<3600	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<4500	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<1670	ppb	GE
		HEXAACLOROPHENE	<12300	ppb	GE
F	SS-08	BARIUM (FLAA/EPA 208.1)	6	ppm	C2
		CHROMIUM (FLAA/EPA 218.1)	4.4	ppm	C2
		MERCURY	0.6	ppm	C2
		LEAD (GFAA/EPA 239.2)	9	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	<0.05	ppm	C2
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	<100	ppb	C3
		p-ISOPROPYLtolUENE	<100	ppb	C3
		CYCLOHEXANE	<100	ppb	C3
		CHLOROMETHANE	<100	ppb	C3
		DICHLORODIFLUOROMETHANE	<100	ppb	C3
		BROMOMETHANE	<100	ppb	C3
		CHLOROETHANE	<100	ppb	C3
		TRICHLOROFUOROMETHANE	<100	ppb	C3
		trans-1,3-DICHLOROPROPENE	<100	ppb	C3
		cis-1,3-DICHLOROPROPENE	<100	ppb	C3
		1,2-DIBROMOETHANE	<100	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<100	ppb	C3
		ACETONE	<1000	ppb	C3
		HEXAACLOROBUTADIENE	<100	ppb	C3

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continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		METHYL ETHYL KETONE	<500	ppb	C3
		NAPHTHALENE	<100	ppb	C3
		1,2,4-TRICHLOROBENZENE	<100	ppb	C3
		cis-1,2-DICHLOROETHENE	<100	ppb	C3
		DIBROMOMETHANE	<100	ppb	C3
		1,1-DICHLOROPROPENE	<100	ppb	C3
		1,3-DICHLOROPROPANE	<100	ppb	C3
		2,2-DICHLOROPROPANE	<100	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<100	ppb	C3
		1,2,3-TRICHLOROBENZENE	<100	ppb	C3
		n-BUTYLBENZENE	<100	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<100	ppb	C3
		tert-BUTYLBENZENE	<100	ppb	C3
		sec-BUTYL BENZENE	<100	ppb	C3
		BROMOCHLOROMETHANE	<100	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<100	ppb	C3
		CHLOROFORM	<100	ppb	C3
		BROMOFORM	<100	ppb	C3
		BROMODICHLOROMETHANE	<100	ppb	C3
		DIBROMOCHLOROMETHANE	<100	ppb	C3
		METHYLENE CHLORIDE	<100	ppb	C3
		2-CHLOROTOLUENE	<100	ppb	C3
		4-CHLOROTOLUENE	<100	ppb	C3
		1,3-DICHLOROBENZENE	<100	ppb	C3
		1,2-DICHLOROBENZENE	<100	ppb	C3
		1,4-DICHLOROBENZENE	<100	ppb	C3
		VINYL CHLORIDE	<100	ppb	C3
		1,1-DICHLOROETHENE	<100	ppb	C3
		1,1-DICHLOROETHANE	<100	ppb	C3
		trans-1,2-DICHLOROETHENE	<100	ppb	C3
		1,2-DICHLOROETHANE	<100	ppb	C3
		1,1,1-TRICHLOROETHANE	101	ppb	C3
		CARBON TETRACHLORIDE	<100	ppb	C3
		1,2-DICHLOROPROPANE	<100	ppb	C3
		TRICHLOROETHENE	<100	ppb	C3
		1,1,2-TRICHLOROETHANE	<100	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<100	ppb	C3
		TETRACHLOROETHENE	<100	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<100	ppb	C3
		CHLOROBENZENE	<100	ppb	C3
		BENZENE	<100	ppb	C3
		TOLUENE	<100	ppb	C3
		ETHYLBENZENE	<100	ppb	C3
		BROMOBENZENE	<100	ppb	C3

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continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
G	CS-09	ISOPROPYLBENZENE	<100	ppb	C3
		STYRENE	<100	ppb	C3
		o-XYLENE	<100	ppb	C3
		n-PROPYLBENZENE	<100	ppb	C3
		p-XYLENE/m-XYLENE	<100	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<333	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<1650	ppb	GE
		o-CRESOL	<330	ppb	GE
		p-CRESOL	<330	ppb	GE
		TRICHLOROPHENOL	<330	ppb	GE
		PENTACHLOROPHENOL	<330	ppb	GE
		2,4- DINITROPHENOL	<1490	ppb	GE
		2,4,6- TRICHLOROPHENOL	<330	ppb	GE
		2,4- DICHLOROPHENOL	<330	ppb	GE
		2,4- DIMETHYLPHENOL	<330	ppb	GE
		2-NITROPHENOL	<330	ppb	GE
		4-NITROPHENOL	<3160	ppb	GE
		2- CHLOROPHENOL	<330	ppb	GE
		PHENOLS	<330	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<390	ppb	GE
		2,6- DICHLOROPHENOL	<360	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<450	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<330	ppb	GE
		HEXAICLOROPHENE	<1230	ppb	GE
		BARIUM (FLAA/EPA 208.1)	5	ppm	C2
		CHROMIUM (FLAA/EPA 218.1)	21	ppm	C2
		MERCURY	0.25	ppm	C2
		LEAD (GFAA/EPA 239.2)	18	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	0.23	ppm	C2
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	10:38pm	10-30-92	C3
		p-ISOPROPYLtoluene	<100	ppb	C3
		CYCLOHEXANE	<100	ppb	C3
		CHLOROMETHANE	<100	ppb	C3
		DICHLORODIFLUOROMETHANE	<100	ppb	C3
		BROMOMETHANE	<100	ppb	C3
		CHLOROETHANE	<100	ppb	C3
		TRICHLOROFUOROMETHANE	<100	ppb	C3
		trans-1,3-DICHLOROPROPENE	<100	ppb	C3
		cis-1,3-DICHLOROPROPENE	<100	ppb	C3
		1,2-DIBROMOETHANE	<100	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<100	ppb	C3
		ACETONE	<1000	ppb	C3

This report is continued on the next page....

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		HEXACHLOROBUTADIENE	<100	ppb	C3
		METHYL ETHYL KETONE	<500	ppb	C3
		NAPHTHALENE	<100	ppb	C3
		1, 2, 4-TRICHLOROBENZENE	<100	ppb	C3
		cis-1, 2-DICHLOROETHENE	<100	ppb	C3
		DIBROMOMETHANE	<100	ppb	C3
		1, 1-DICHLOROPROPENE	<100	ppb	C3
		1, 3-DICHLOROPROPANE	<100	ppb	C3
		2, 2-DICHLOROPROPANE	<100	ppb	C3
		1, 2, 4-TRIMETHYLBENZENE	<100	ppb	C3
		1, 2, 3-TRICHLOROBENZENE	<100	ppb	C3
		n-BUTYLBENZENE	<100	ppb	C3
		1, 3, 5-TRIMETHYLBENZENE	<100	ppb	C3
		tert-BUTYLBENZENE	<100	ppb	C3
		sec-BUTYL BENZENE	<100	ppb	C3
		BROMOCHLOROMETHANE	<100	ppb	C3
		1, 2-DIBROMO-3-CHLOROPROPANE	<100	ppb	C3
		CHLOROFORM	<100	ppb	C3
		BROMOFORM	<100	ppb	C3
		BROMODICHLOROMETHANE	<100	ppb	C3
		DIBROMOCHLOROMETHANE	<100	ppb	C3
		METHYLENE CHLORIDE	<100	ppb	C3
		2-CHLOROTOLUENE	<100	ppb	C3
		4-CHLOROTOLUENE	<100	ppb	C3
		1, 3-DICHLOROBENZENE	<100	ppb	C3
		1, 2-DICHLOROBENZENE	<100	ppb	C3
		1, 4-DICHLOROBENZENE	<100	ppb	C3
		VINYL CHLORIDE	<100	ppb	C3
		1, 1-DICHLOROETHENE	<100	ppb	C3
		1, 1-DICHLOROETHANE	<100	ppb	C3
		trans-1, 2-DICHLOROETHENE	<100	ppb	C3
		1, 2-DICHLOROETHANE	<100	ppb	C3
		1, 1, 1-TRICHLOROETHANE	103	ppb	C3
		CARBON TETRACHLORIDE	<100	ppb	C3
		1, 2-DICHLOROPROPANE	<100	ppb	C3
		TRICHLOROETHENE	<100	ppb	C3
		1, 1, 2-TRICHLOROETHANE	<100	ppb	C3
		1, 1, 1, 2-TETRACHLOROETHANE	<100	ppb	C3
		TETRACHLOROETHENE	<100	ppb	C3
		1, 1, 2, 2-TETRACHLOROETHANE	<100	ppb	C3
		CHLOROBENZENE	<100	ppb	C3
		BENZENE	<100	ppb	C3
		TOLUENE	<100	ppb	C3
		ETHYLBENZENE	<100	ppb	C3

This report is continued on the next page....

continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
H	SS-10	BROMOBENZENE	<100	ppb	C3
		ISOPROPYLBENZENE	<100	ppb	C3
		STYRENE	<100	ppb	C3
		o-XYLENE	<100	ppb	C3
		n-PROPYLBENZENE	<100	ppb	C3
		p-XYLENE/m-XYLENE	<100	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.	ppb	GE
		m-CRESOL	<3300	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<1670	ppb	GE
		o-CRESOL	<1670	ppb	GE
		p-CRESOL	<1670	ppb	GE
		TRICHLOROPHENOL	<1670	ppb	GE
		PENTACHLOROPHENOL	<1670	ppb	GE
		2,4- DINITROPHENOL	<3330	ppb	GE
		2,4,6- TRICHLOROPHENOL	<1670	ppb	GE
		2,4- DICHLOROPHENOL	<1670	ppb	GE
		2,4- DIMETHYLPHENOL	<1670	ppb	GE
		2-NITROPHENOL	<1670	ppb	GE
		4-NITROPHENOL	<31600	ppb	GE
		2- CHLOROPHENOL	<1670	ppb	GE
		PHENOLS	<1670	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<3900	ppb	GE
		2,6- DICHLOROPHENOL	<3600	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<4500	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<1670	ppb	GE
		HEXAACLOROPHENE	<12300	ppb	GE
		BARIUM (FLAA/EPA 208.1)	11	ppm	C2
		CHROMIUM (FLAA/EPA 218.1)	2.1	ppm	C2
		MERCURY	0.43	ppm	C2
		LEAD (GFAA/EPA 239.2)	4.3	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	0.16	ppm	C2
		VOLATILES (SW 846 8260)	.	ppm	C3
		DATE OF ANALYSIS	12:01am	10-31-92	C3
		p-ISOPROPYLtoluene	<100	ppb	C3
		CYCLOHEXANE	<100	ppb	C3
		CHLOROMETHANE	<100	ppb	C3
		DICHLORODIFLUOROMETHANE	<100	ppb	C3
		BROMOMETHANE	<100	ppb	C3
		CHLOROETHANE	<100	ppb	C3
		TRICHLOROFUOROMETHANE	<100	ppb	C3
		trans-1,3-DICHLOROPROPENE	<100	ppb	C3
		cis-1,3-DICHLOROPROPENE	<100	ppb	C3
		1,2-DIBROMOETHANE	<100	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<100	ppb	C3

This report is continued on the next page....

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		ACETONE	<1000	ppb	C3
		HEXACHLOROBUTADIENE	<100	ppb	C3
		METHYL ETHYL KETONE	<500	ppb	C3
		NAPHTHALENE	<100	ppb	C3
		1, 2, 4-TRICHLOROBENZENE	<100	ppb	C3
		cis-1, 2-DICHLOROETHENE	<100	ppb	C3
		DIBROMOMETHANE	<100	ppb	C3
		1, 1-DICHLOROPROPENE	<100	ppb	C3
		1, 3-DICHLOROPROPANE	<100	ppb	C3
		2, 2-DICHLOROPROPANE	<100	ppb	C3
		1, 2, 4-TRIMETHYLBENZENE	<100	ppb	C3
		1, 2, 3-TRICHLOROBENZENE	<100	ppb	C3
		n-BUTYLBENZENE	<100	ppb	C3
		1, 3, 5-TRIMETHYLBENZENE	<100	ppb	C3
		tert-BUTYLBENZENE	<100	ppb	C3
		sec-BUTYL BENZENE	<100	ppb	C3
		BROMOCHLOROMETHANE	<100	ppb	C3
		1, 2-DIBROMO-3-CHLOROPROPANE	<100	ppb	C3
		CHLOROFORM	<100	ppb	C3
		BROMOFORM	<100	ppb	C3
		BROMODICHLOROMETHANE	<100	ppb	C3
		DIBROMOCHLOROMETHANE	<100	ppb	C3
		METHYLENE CHLORIDE	<100	ppb	C3
		2-CHLOROTOLUENE	<100	ppb	C3
		4-CHLOROTOLUENE	<100	ppb	C3
		1, 3-DICHLOROBENZENE	<100	ppb	C3
		1, 2-DICHLOROBENZENE	<100	ppb	C3
		1, 4-DICHLOROBENZENE	<100	ppb	C3
		VINYL CHLORIDE	<100	ppb	C3
		1, 1-DICHLOROETHENE	<100	ppb	C3
		1, 1-DICHLOROETHANE	<100	ppb	C3
		trans-1, 2-DICHLOROETHENE	<100	ppb	C3
		1, 2-DICHLOROETHANE	<100	ppb	C3
		1, 1, 1-TRICHLOROETHANE	103	ppb	C3
		CARBON TETRACHLORIDE	<100	ppb	C3
		1, 2-DICHLOROPROPANE	<100	ppb	C3
		TRICHLOROETHENE	<100	ppb	C3
		1, 1, 2-TRICHLOROETHANE	<100	ppb	C3
		1, 1, 1, 2-TETRACHLOROETHANE	<100	ppb	C3
		TETRACHLOROETHENE	<100	ppb	C3
		1, 1, 2, 2-TETRACHLOROETHANE	<100	ppb	C3
		CHLOROBENZENE	<100	ppb	C3
		BENZENE	<100	ppb	C3
		TOLUENE	<100	ppb	C3

This report is continued on the next page....

continuation of report of PBS & J SITE SURVEY PROJECT

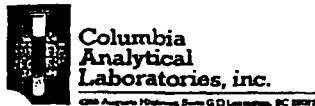
SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
I	SS-11	ETHYLBENZENE	<100	ppb	C3
		BROMOBENZENE	<100	ppb	C3
		ISOPROPYLBENZENE	<100	ppb	C3
		STYRENE	<100	ppb	C3
		<i>o</i> -XYLENE	<100	ppb	C3
		<i>n</i> -PROPYLBENZENE	<100	ppb	C3
		<i>p</i> -XYLENE/ <i>m</i> -XYLENE	<100	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		<i>m</i> -CRESOL	<333	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<1650	ppb	GE
		<i>o</i> -CRESOL	<330	ppb	GE
		<i>p</i> -CRESOL	<330	ppb	GE
		TRICHLOROPHENOL	<330	ppb	GE
		PENTACHLOROPHENOL	<330	ppb	GE
		2,4- DINITROPHENOL	<1490	ppb	GE
		2,4,6- TRICHLOROPHENOL	<330	ppb	GE
		2,4- DICHLOROPHENOL	<330	ppb	GE
		2,4- DIMETHYLPHENOL	<330	ppb	GE
		2-NITROPHENOL	<330	ppb	GE
		4-NITROPHENOL	<3160	ppb	GE
		2- CHLOROPHENOL	<330	ppb	GE
		PHENOLS	<330	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<390	ppb	GE
		2,6- DICHLOROPHENOL	<360	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<450	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<330	ppb	GE
		HEXAACLOROPHENE	<1230	ppb	GE
		BARIUM (FLAA/EPA 208.1)	13	ppm	C2
		CHROMIUM (FLAA/EPA 218.1)	27	ppm	C2
		MERCURY	0.79	ppm	C2
		LEAD (GFAA/EPA 239.2)	58	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	4.6	ppm	C2
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	1:25am	10-31-92	C3
		<i>p</i> -ISOPROPYLtoluene	<100	ppb	C3
		CYCLOHEXANE	<100	ppb	C3
		CHLOROMETHANE	<100	ppb	C3
		DICHLORODIFLUOROMETHANE	<100	ppb	C3
		BROMOMETHANE	<100	ppb	C3
		CHLOROETHANE	<100	ppb	C3
		TRICHLOROFUOROMETHANE	<100	ppb	C3
		trans-1,3-DICHLOROPROPENE	<100	ppb	C3
		cis-1,3-DICHLOROPROPENE	<100	ppb	C3
		1,2-DIBROMOETHANE	<100	ppb	C3

This report is continued on the next page....

continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		2-CHLOROETHYL VINYL ETHER	<100	ppb	C3
		ACETONE	<1000	ppb	C3
		HEXACHLOROBUTADIENE	<100	ppb	C3
		METHYL ETHYL KETONE	<500	ppb	C3
		NAPHTHALENE	<100	ppb	C3
		1,2,4-TRICHLOROBENZENE	<100	ppb	C3
		cis-1,2-DICHLOROETHENE	<100	ppb	C3
		DIBROMOMETHANE	<100	ppb	C3
		1,1-DICHLOROPROPENE	<100	ppb	C3
		1,3-DICHLOROPROPANE	<100	ppb	C3
		2,2-DICHLOROPROPANE	<100	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<100	ppb	C3
		1,2,3-TRICHLOROBENZENE	<100	ppb	C3
		n-BUTYLBENZENE	<100	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<100	ppb	C3
		tert-BUTYLBENZENE	<100	ppb	C3
		sec-BUTYL BENZENE	<100	ppb	C3
		BROMOCHLOROMETHANE	<100	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<100	ppb	C3
		CHLOROFORM	<100	ppb	C3
		BROMOFORM	<100	ppb	C3
		BROMODICHLOROMETHANE	<100	ppb	C3
		DIBROMOCHLOROMETHANE	<100	ppb	C3
		METHYLENE CHLORIDE	<100	ppb	C3
		2-CHLOROTOLUENE	<100	ppb	C3
		4-CHLOROTOLUENE	<100	ppb	C3
		1,3-DICHLOROBENZENE	<100	ppb	C3
		1,2-DICHLOROBENZENE	<100	ppb	C3
		1,4-DICHLOROBENZENE	<100	ppb	C3
		VINYL CHLORIDE	<100	ppb	C3
		1,1-DICHLOROETHENE	<100	ppb	C3
		1,1-DICHLOROETHANE	<100	ppb	C3
		trans-1,2-DICHLOROETHENE	<100	ppb	C3
		1,2-DICHLOROETHANE	<100	ppb	C3
		1,1,1-TRICHLOROETHANE	106	ppb	C3
		CARBON TETRACHLORIDE	<100	ppb	C3
		1,2-DICHLOROPROPANE	<100	ppb	C3
		TRICHLOROETHENE	<100	ppb	C3
		1,1,2-TRICHLOROETHANE	<100	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<100	ppb	C3
		TETRACHLOROETHENE	<100	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<100	ppb	C3
		CHLOROBENZENE	<100	ppb	C3
		BENZENE	<100	ppb	C3

This report is continued on the next page....



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LAB#: 921028-09

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		TOLUENE	<100	ppb	C3
		ETHYLBENZENE	<100	ppb	C3
		BROMOBENZENE	<100	ppb	C3
		ISOPROPYLBENZENE	<100	ppb	C3
		STYRENE	<100	ppb	C3
		O-XYLENE	<100	ppb	C3
		n-PROPYLBENZENE	<100	ppb	C3
		p-XYLENE/m-XYLENE	<100	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<333	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<1650	ppb	GE
		O-CRESOL	<330	ppb	GE
		p-CRESOL	<330	ppb	GE
		TRICHLOROPHENOL	<330	ppb	GE
		PENTACHLOROPHENOL	<330	ppb	GE
		2,4- DINITROPHENOL	<1490	ppb	GE
		2,4,6- TRICHLOROPHENOL	<330	ppb	GE
		2,4- DICHLOROPHENOL	<330	ppb	GE
		2,4- DIMETHYLPHENOL	<330	ppb	GE
		2-NITROPHENOL	<330	ppb	GE
		4-NITROPHENOL	<3160	ppb	GE
		2- CHLOROPHENOL	<330	ppb	GE
		PHENOLS	<330	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<390	ppb	GE
		2,6- DICHLOROPHENOL	<360	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<450	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<330	ppb	GE
		HEXAACLOROPHENE	<1230	ppb	GE

ID LABORATORY TEST LOCATION NUMBER  
C1= Columbia-inorganics 32114  
C3= Columbia-organics 32114

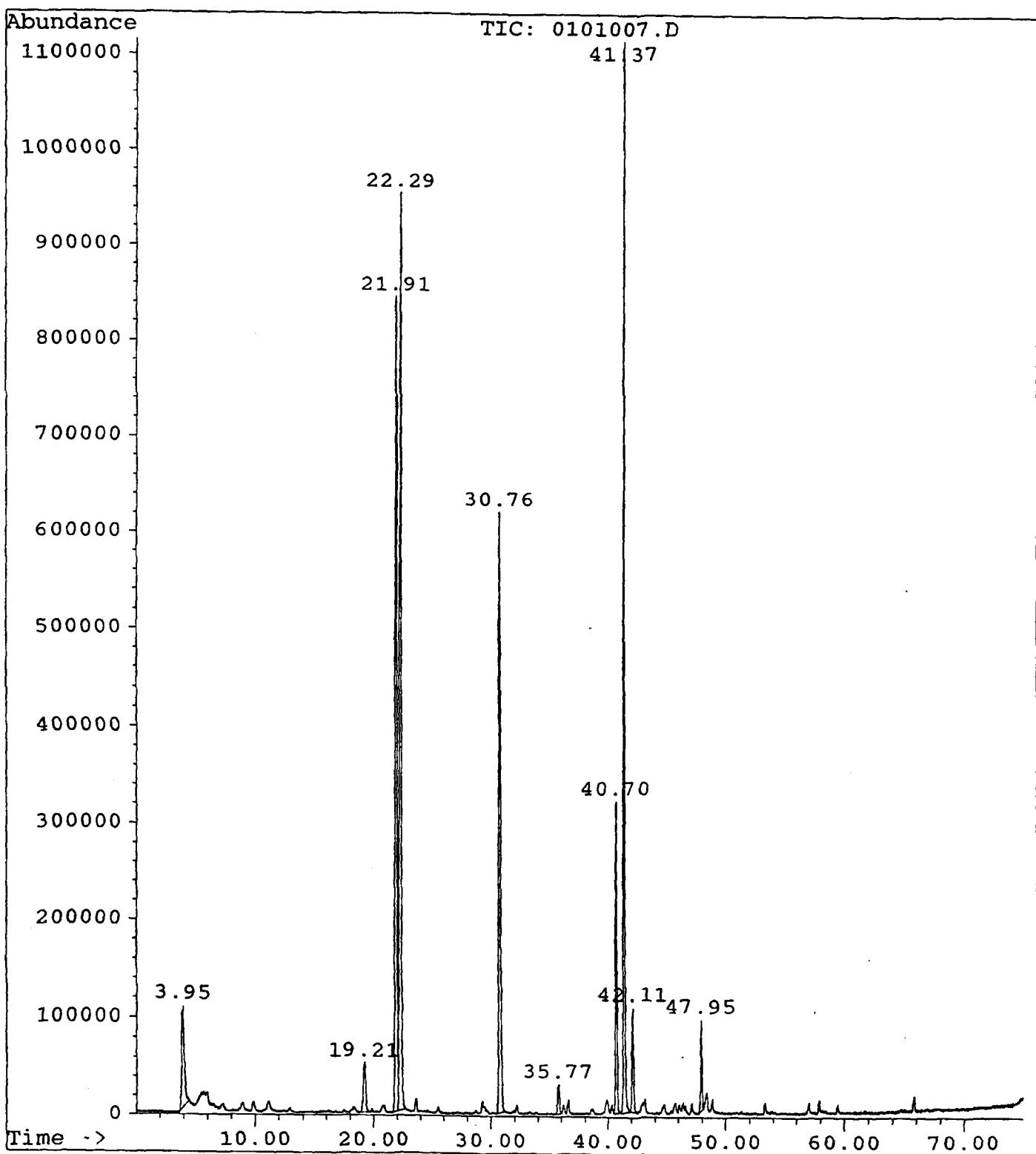
ID LABORATORY TEST LOCATION NUMBER  
C2= Columbia-metals 32114  
GE= Lab Certification # 10120

Respectfully submitted,  
Columbia Analytical Laboratories, Inc.

*7/14*  
Mark W. Gilbert  
Project Director

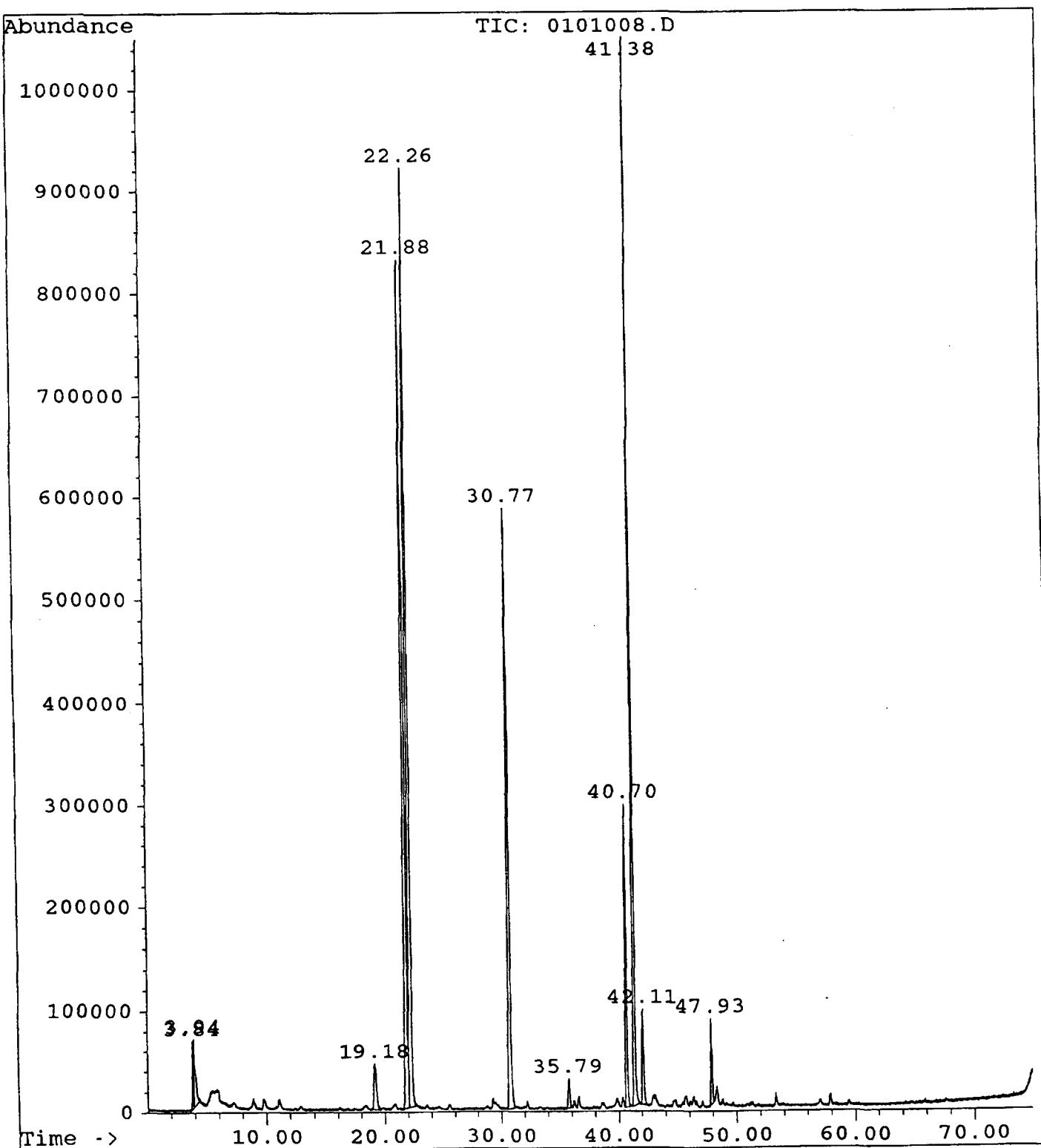
CS-02/03

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Operator:  
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Method File: acquire.M  
Sample Name: 7  
Misc Info:  
ALS vial: 1



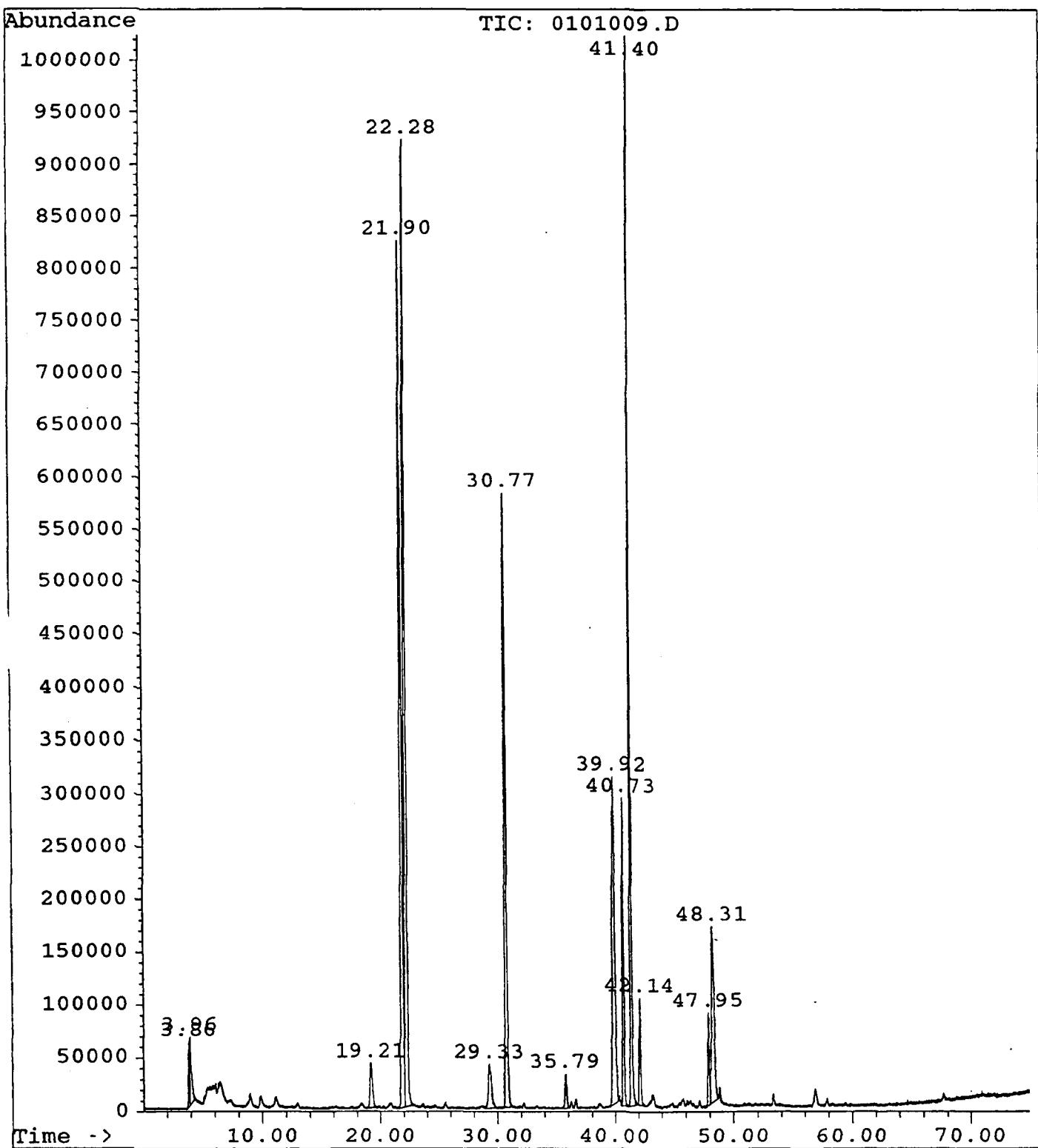
SS-04

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Operator:  
Date Acquired: 25 Nov 92 7:49 pm  
Method File: acquire.M  
Sample Name: 8  
Misc Info:  
ALS vial: 1



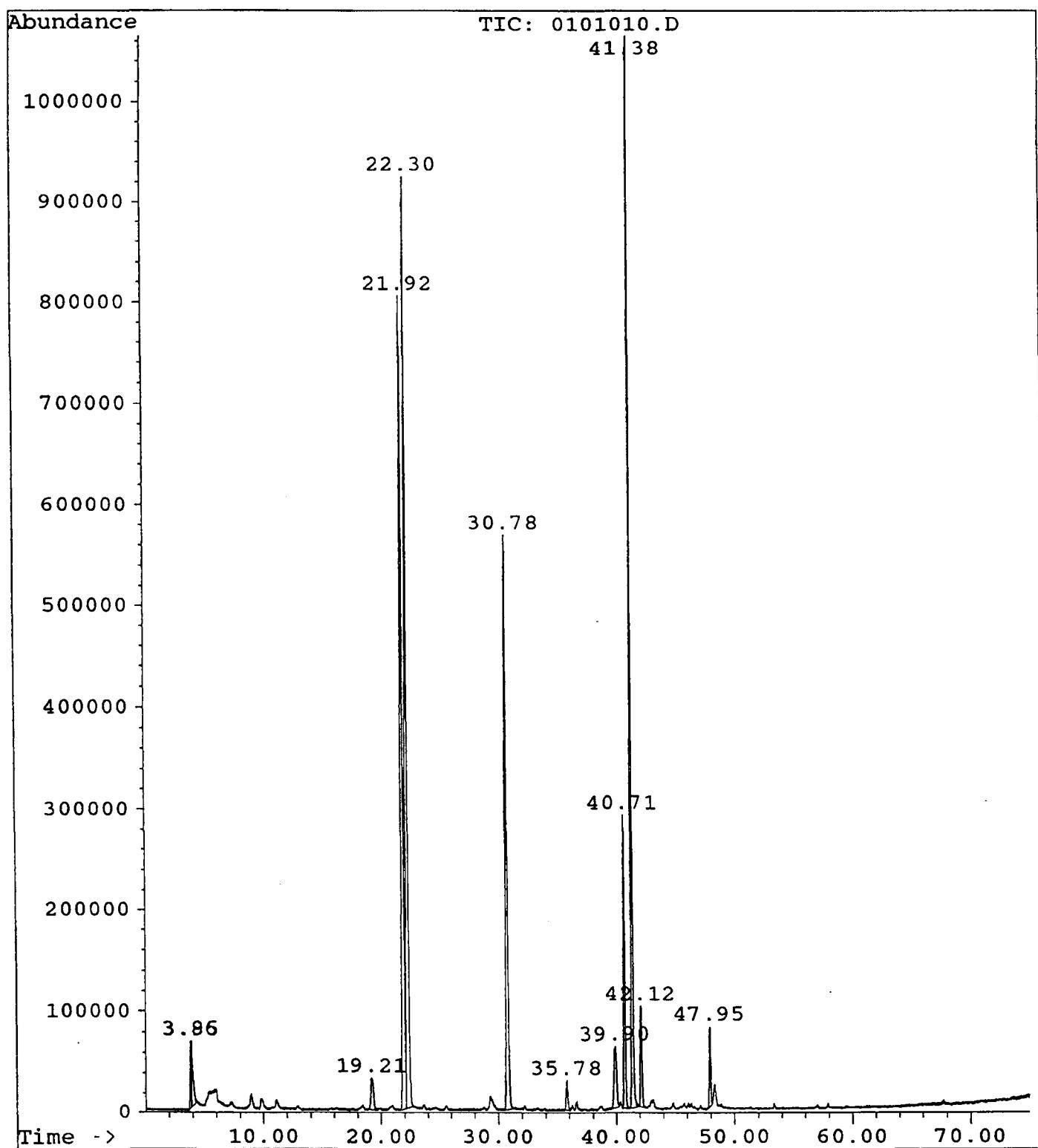
SS-OS

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Operator:  
Date Acquired: 25 Nov 92 9:13 pm  
Method File: acquire.M  
Sample Name: 9  
Misc Info:  
ALS vial: 1



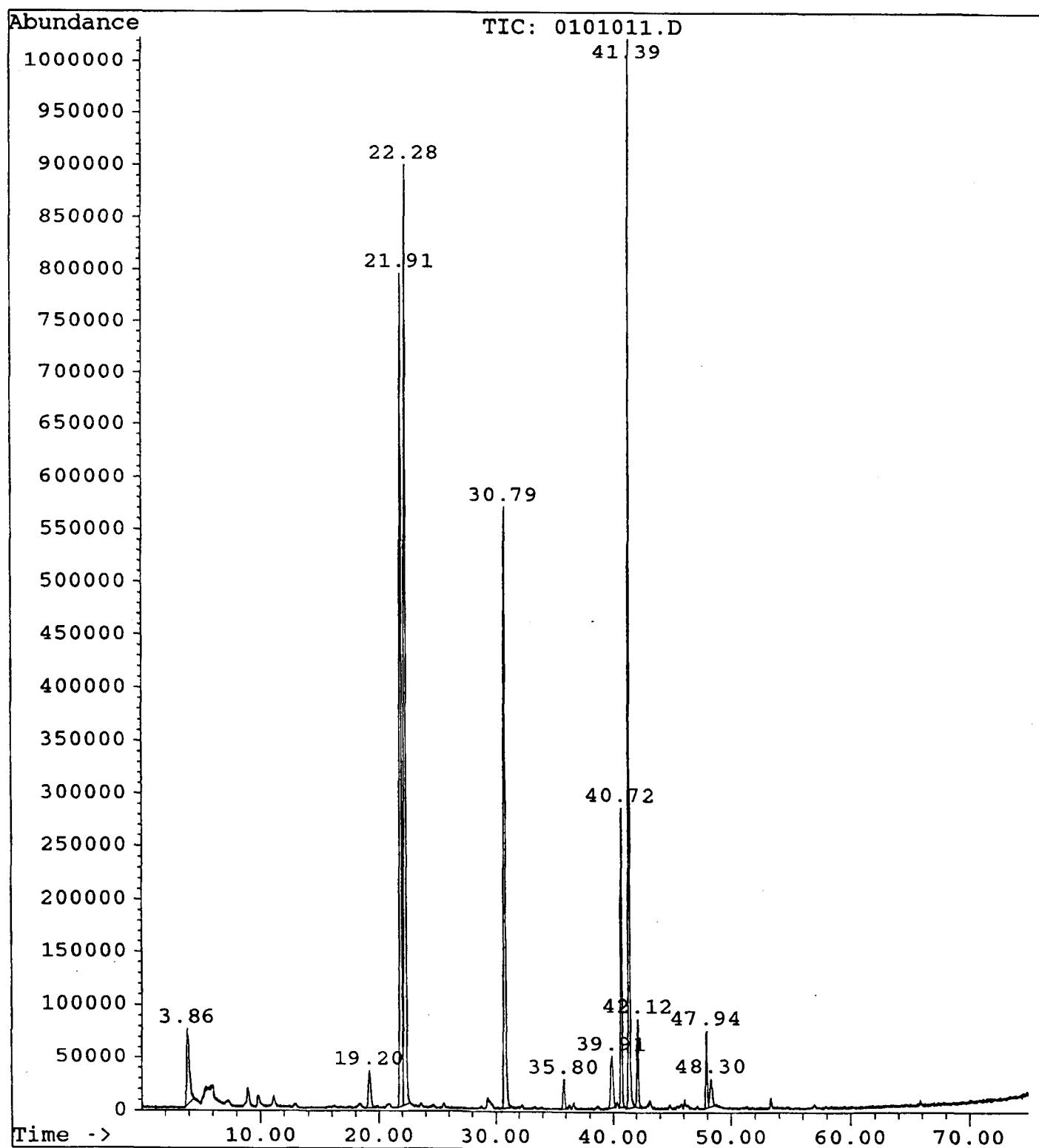
SS-06

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Operator:  
Date Acquired: 25 Nov 92 10:37 pm  
Method File: acquire.M  
Sample Name: 10  
Misc Info:  
ALS vial: 1



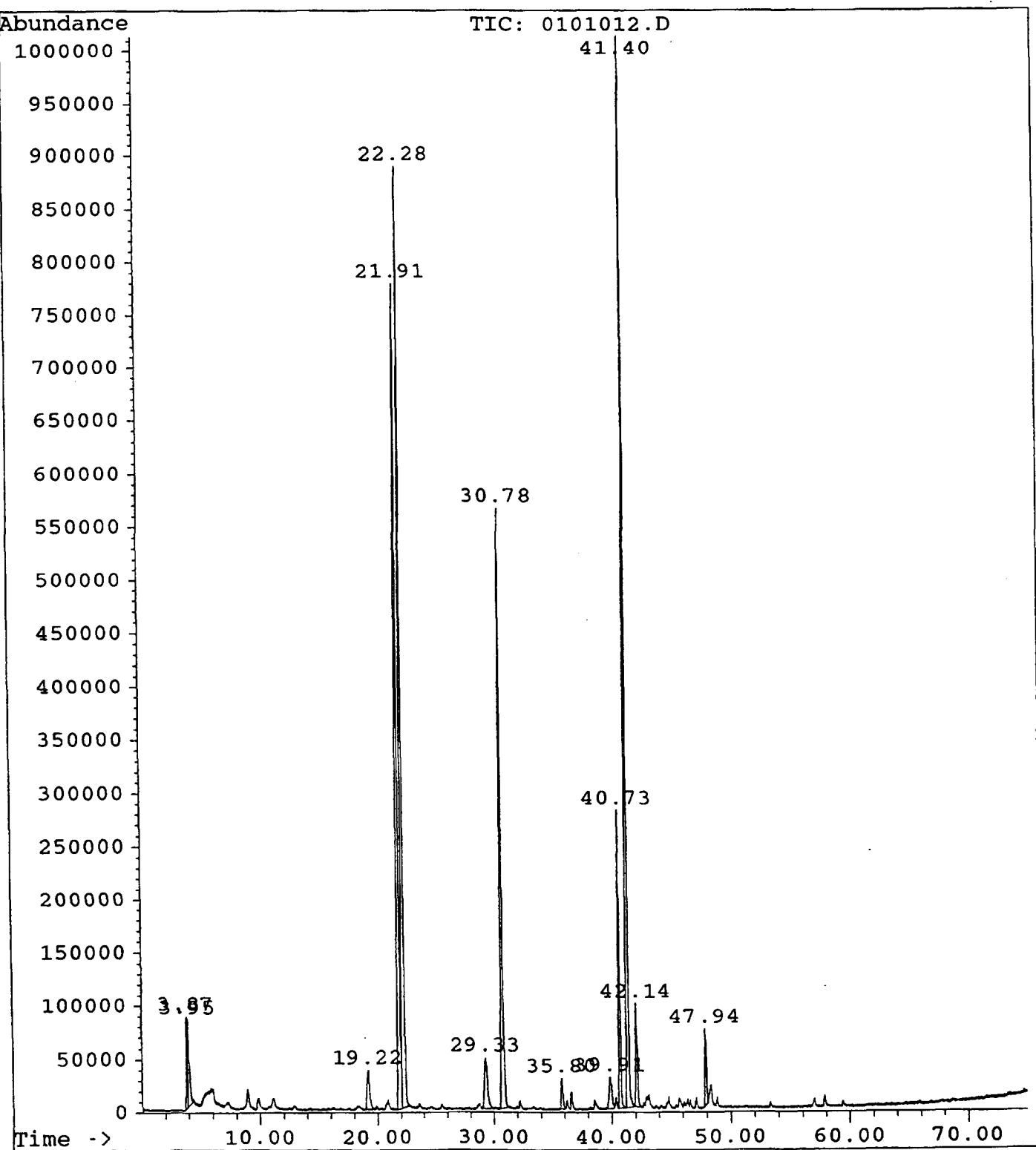
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Operator:  
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Method File: acquire.M  
Sample Name: 11  
Misc Info:  
ALS vial: 1

SS-08



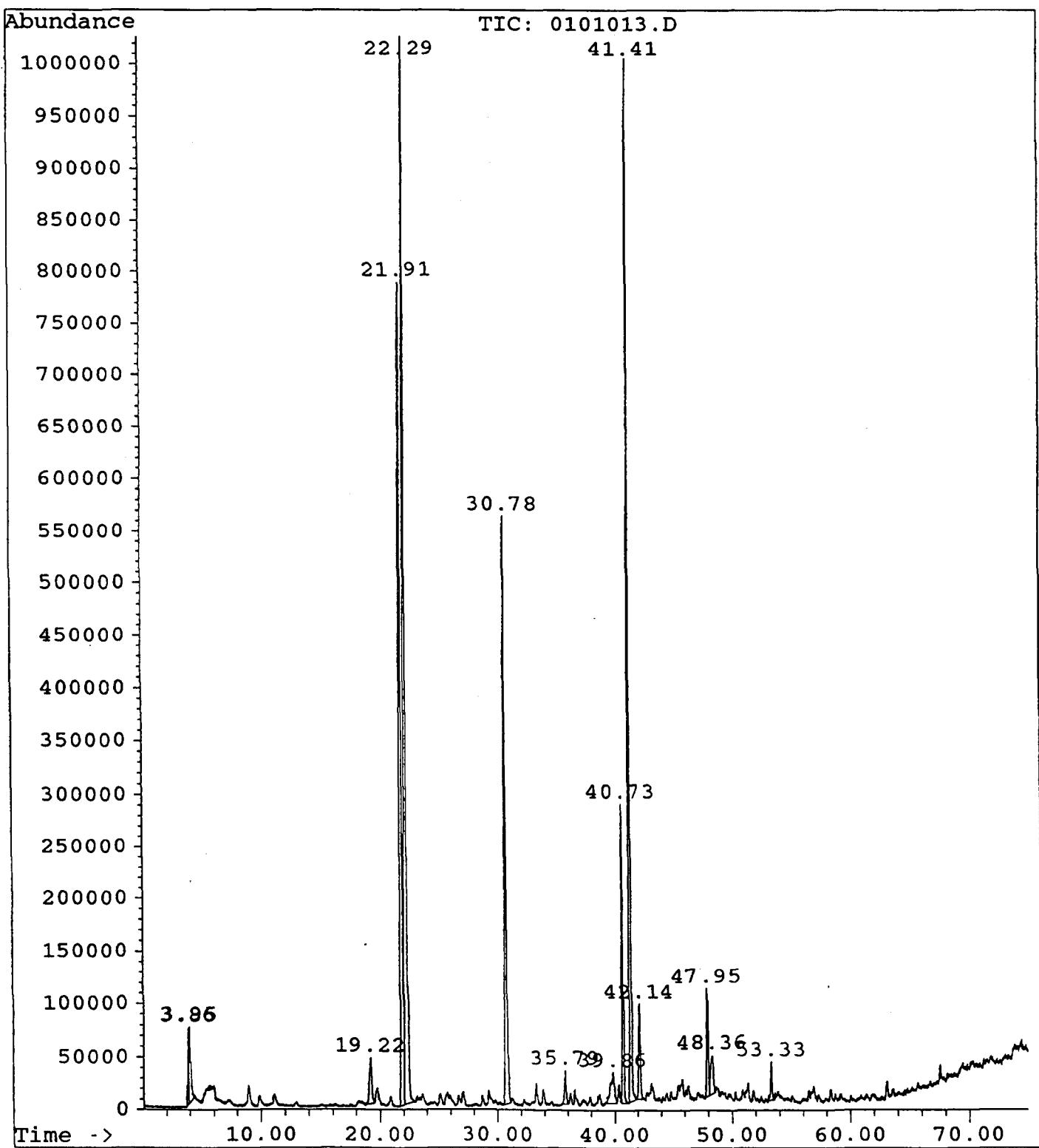
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Operator:  
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Method File: acquire.M  
Sample Name: 12  
Misc Info:  
ALS vial: 1

SS-09



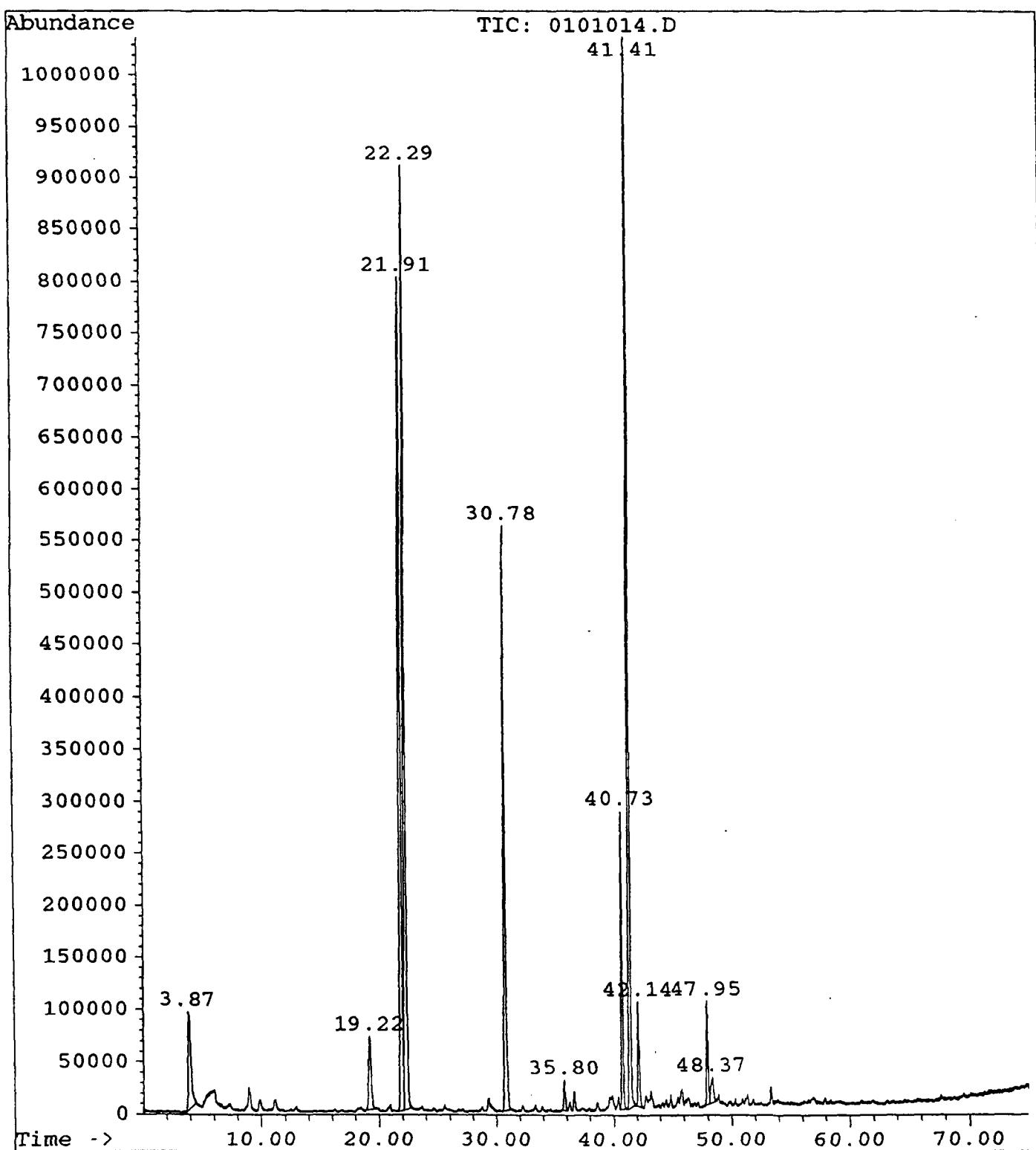
SS-10

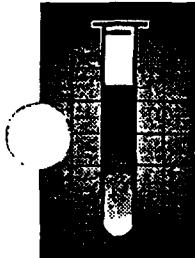
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Operator:  
Date Acquired: 26 Nov 92 2:49 am  
Method File: acquire.M  
Sample Name: 13  
Misc Info:  
ALS vial: 1



File: C:\CHEMPC\DATA\0101014.D  
Operator:  
Date Acquired: 26 Nov 92 4:13 am  
Method File: acquire.M  
Sample Name: 14  
Misc Info:  
ALS vial: 1

SS-11





DEC 14 1992

# Columbia Analytical Laboratories, inc.

4265 Augusta Highway, Suite G □ Lexington, SC 29073

## Laboratory Report

(803)957-6608 FAX(803)957-6912

DATE: December 07, 1992

LAB# : 921124-01  
JOB# : 00189

REPORT OF: PBS &amp; J SITE SURVEY PROJECT

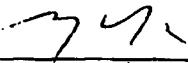
CLIENT: KINGS LABORATORY, INC.  
POST OFFICE BOX 120  
BLYTHEWOOD SC 29016

Samples were received by Columbia Analytical Laboratories, Inc. on 11/24/92, at 12:11 pm, and were collected using proper EPA protocol. Testing was conducted at the locations(s) enumerated at the end of this report.

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
A	CS-02/03	LIBRARY SEARCH-ACID COMPOUNDS GC/MS LIBRARY SEARCH- VOC'S	yes done	ppm	GE
B	SS-04	LIBRARY SEARCH-ACID COMPOUNDS GC/MS LIBRARY SEARCH- VOC'S	yes done	ppm	GE
C	SS-05	LIBRARY SEARCH-ACID COMPOUNDS GC/MS LIBRARY SEARCH- VOC'S	yes done	ppm	GE
D	SS-07	LIBRARY SEARCH-ACID COMPOUNDS GC/MS LIBRARY SEARCH- VOC'S	yes done	ppm	GE
E	SS-08	LIBRARY SEARCH-ACID COMPOUNDS GC/MS LIBRARY SEARCH- VOC'S	yes done	ppm	GE
F	CS-09	LIBRARY SEARCH-ACID COMPOUNDS GC/MS LIBRARY SEARCH- VOC'S	yes done	ppm	GE
G	SS-10	LIBRARY SEARCH-ACID COMPOUNDS GC/MS LIBRARY SEARCH- VOC'S	yes done	ppm	GE
H	SS-11	LIBRARY SEARCH-ACID COMPOUNDS GC/MS LIBRARY SEARCH- VOC'S	yes done	ppm	GE

ID LABORATORY TEST LOCATION NUMBER  
C3= Columbia-organics 32114ID LABORATORY TEST LOCATION NUMBER  
GE= Lab Certification # 10120

Respectfully submitted,  
Columbia Analytical Laboratories, Inc.

  
 Mark W. Gilbert  
Project Director

Laboratory I.D. No. \_\_\_\_\_

Part

**Send Results To**  
**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**1909 SUMTER STREET**  
**P.O. BOX 106**  
**COLUMBIA, S.C. 29202-0106**  
**(803) 256-7275**

COLUMBIA, S.C. 29202-0106  
(803) 256-7275  
Attn: Mike Pellerin  
Date Shipped 10/28/92  
Shipment Service Hand Delivered  
Air Bill No.         
Cooler No. 1 of 1

**Relinquished by: (Signature)**

**Date/Time**

**Received by: (Signature)**

**Remarks/Invoice Instructions:**

**Relinquished by:** (Signature)

**Date/Time**

**Received by: (Signature)**

**Bellmouished by:** (Signature)

**Date/Time**

**Received for Laboratory by:**  
**(Signature)**



# GENERAL ENGINEERING LABORATORIES

Environmental Consulting and Analytical Services

Molly F. Greene  
President

George C. Greene, P.E., Ph.D.  
Vice President  
SC Registration No. 9103

Serving Industry And The Environment Since 1981

Laboratory Certifications:	
FL	E87156/87294
NC	233
SC	10120
VA	00151
TN	02934

December 9, 1992

Mr. Mark Gilbert  
Columbia Analytical, Inc.  
4265 Augusta Highway  
Lexington, SC 29072

Re: 10 Highest Peaks for Laboratory ID's 9211468-01 through 08

Dear Mark:

In response to the referenced lab number, the sample was screened for the 10 highest peaks. However, it is often difficult to distinguish between the various possibilities by using a simple mass spectral library search. Positive identification would require the use of pure substance standards for the purpose of comparing gas chromatographic retention times and mass spectra. Consequently, the identifications presented below must be considered as tentatively identified compounds. Also the number for the Probability Base Matching (PBM) is a percentage based on the mass spectral library search of over 48,000 compounds. We have arbitrarily listed those with a PBM of 80% or greater.

<u>Identification (TIC)</u>	<u>PBM</u>	<u>Estimated Concentration</u>
Lab ID # 9211468-01 through 08		

There were no tentatively identified compounds detected for acid compounds.

If you have any questions, feel free to call me or I will be happy to let you discuss the review with our Quality Control Officer.

Yours very truly,

Terri Fitzgerald  
Project Manager

coan00191.120992



# Columbia Analytical Laboratories, inc.

4265 Augusta Highway, Suite G □ Lexington, SC 29073

## Laboratory Report

(803)957-6608 FAX(803)957-6912

**DATE:** December 16, 1992

**LAB#** : 921201-24  
**JOB#** : 00189

**REPORT OF: PBS & J SITE SURVEY PROJECT**

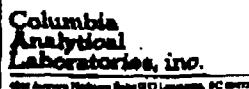
**CLIENT: KINGS LABORATORY, INC.  
POST OFFICE BOX 120  
BLYTHEWOOD SC 29016**

COLLECTED  
" / 30 / 92

Samples were received by Columbia Analytical Laboratories, Inc. on 12/01/92, at 02:34 pm, and were collected using proper EPA protocol. Testing was conducted at the locations(s) enumerated at the end of this report.

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
A	EDW-3	BARIUM (FLAA/EPA 208.1)	0.1	ppm	C2
		CYANIDE	<0.01	ppm	C1
		CONDUCTIVITY	34	umhos/cm <sup>3</sup>	C1
		CHROMIUM	<0.05	ppm	C2
		MERCURY	<0.0002	ppm	C2
		LEAD (FURNACE EPA - 239.2)	<0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	<0.005	ppm	C2
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	4:58pm	12-2-92	C3
		p-ISOPROPYL TOLUENE	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3
		1,2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXACHLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3

This report is continued on the next page....

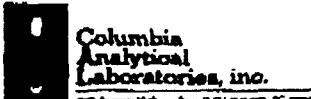


Page  
LAB#: 921201-2

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		DIBROMOMETHANE	<5	ppb	C3
		1,1-DICHLOROPROPENE	<5	ppb	C3
		1,3-DICHLOROPROPANE	<5	ppb	C3
		2,2-DICHLOROPROPANE	<5	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<5	ppb	C3
		1,2,3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYLBENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppb	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1,3-DICHLOROBENZENE	<5	ppb	C3
		1,2-DICHLOROBENZENE	<5	ppb	C3
		1,4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1,1-DICHLOROETHENE	<5	ppb	C3
		1,1-DICHLOROETHANE	<5	ppb	C3
		trans-1,2-DICHLOROETHENE	<5	ppb	C3
		1,2-DICHLOROETHANE	<5	ppb	C3
		1,1,1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1,2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1,1,2-TRICHLOROETHANE	<5	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		o-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3

This report is continued on the next page....



Page  
LAB #: 921201-2

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		p-XYLENE/m-XYLENE	<5	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10	ppb	GE
		p-CRESOL	<10	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10	ppb	GE
		PENTACHLOROPHENOL	<10.0	ppb	GE
		2,4- DINITROPHENOL	<45.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<10	ppb	GE
		2,4- DICHLOROPHENOL	<10	ppb	GE
		2,4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	<10.0	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAACLOROPHENE	<22.1	ppb	GE

ID LABORATORY TEST LOCATION NUMBER	ID LABORATORY TEST LOCATION NUMBER
C1= Columbia-inorganics 32114	C2= Columbia-metals 32114
C3= Columbia-organics 32114	GE= Lab Certification # 10120

Respectfully submitted,  
Columbia Analytical Laboratories, Inc.

774  
Mark W. Gilbert  
Project Director



# Columbia Analytical Laboratories, inc.

4265 Augusta Highway, Suite G □ Lexington, SC 29073

## Laboratory Report

(803)957-6608 FAX(803)957-6912

DATE: December 16, 1992

LAB# : 921202-16  
JOB# : 00189

REPORT OF: PBS &amp; J SITE SURVEY PROJECT

CLIENT: KINGS LABORATORY, INC.  
POST OFFICE BOX 120  
BLYTHEWOOD SC 29016

*COLLECTED*

Samples were received by Columbia Analytical Laboratories, Inc. on 12/02/92, at 03:15 pm, and were collected using proper EPA protocol. Testing was conducted at the locations(s) enumerated at the end of this report.

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
A	PW-2	BARIUM (FLAA/EPA 208.1)	<0.1	ppm	C2
		CYANIDE	0.05	ppm	C1
		CONDUCTIVITY	105	umhos/cm <sup>3</sup>	C1
		CHROMIUM	<0.05	ppm	C2
		MERCURY	<0.0002	ppm	C2
		LEAD (FURNACE EPA - 239.2)	<0.005	ppm	C2
		SELENIUM (GFAA/EPA 270.2)	<0.005	ppm	C2
		VOLATILES (SW 846 8260)	.		C3
		DATE OF ANALYSIS	9:01pm	12-4-92	C3
		p-ISOPROPYL TOLUENE	<5	ppb	C3
		CYCLOHEXANE	<5	ppb	C3
		CHLOROMETHANE	<5	ppb	C3
		DICHLORODIFLUOROMETHANE	<5	ppb	C3
		BROMOMETHANE	<5	ppb	C3
		CHLOROETHANE	<5	ppb	C3
		TRICHLOROFUOROMETHANE	<5	ppb	C3
		trans-1,3-DICHLOROPROPENE	<5	ppb	C3
		cis-1,3-DICHLOROPROPENE	<5	ppb	C3
		1,2-DIBROMOETHANE	<5	ppb	C3
		2-CHLOROETHYL VINYL ETHER	<5	ppb	C3
		ACETONE	<50	ppb	C3
		HEXACHLOROBUTADIENE	<5	ppb	C3
		METHYL ETHYL KETONE	<25	ppb	C3
		NAPHTHALENE	<5	ppb	C3
		1,2,4-TRICHLOROBENZENE	<5	ppb	C3
		cis-1,2-DICHLOROETHENE	<5	ppb	C3

This report is continued on the next page....

**Columbia  
Analytical  
Laboratories, Inc.**  
200 Argonne Avenue Suite G, Columbia, SC 29204

Page  
LAB#: 921202-1

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		DIBROMOMETHANE	<5	ppb	C3
		1,1-DICHLOROPROPENE	<5	ppb	C3
		1,3-DICHLOROPROPANE	<5	ppb	C3
		2,2-DICHLOROPROPANE	<5	ppb	C3
		1,2,4-TRIMETHYLBENZENE	<5	ppb	C3
		1,2,3-TRICHLOROBENZENE	<5	ppb	C3
		n-BUTYLBENZENE	<5	ppb	C3
		1,3,5-TRIMETHYLBENZENE	<5	ppb	C3
		tert-BUTYLBENZENE	<5	ppb	C3
		sec-BUTYL BENZENE	<5	ppb	C3
		BROMOCHLOROMETHANE	<5	ppb	C3
		1,2-DIBROMO-3-CHLOROPROPANE	<5	ppb	C3
		CHLOROFORM	<5	ppb	C3
		BROMOFORM	<5	ppb	C3
		BROMODICHLOROMETHANE	<5	ppb	C3
		DIBROMOCHLOROMETHANE	<5	ppb	C3
		METHYLENE CHLORIDE	<5	ppb	C3
		2-CHLOROTOLUENE	<5	ppm	C3
		4-CHLOROTOLUENE	<5	ppb	C3
		1,3-DICHLOROBENZENE	<5	ppb	C3
		1,2-DICHLOROBENZENE	<5	ppb	C3
		1,4-DICHLOROBENZENE	<5	ppb	C3
		VINYL CHLORIDE	<5	ppb	C3
		1,1-DICHLOROETHENE	<5	ppb	C3
		1,1-DICHLOROETHANE	<5	ppb	C3
		trans-1,2-DICHLOROETHENE	<5	ppb	C3
		1,2-DICHLOROETHANE	<5	ppb	C3
		1,1,1-TRICHLOROETHANE	<5	ppb	C3
		CARBON TETRACHLORIDE	<5	ppb	C3
		1,2-DICHLOROPROPANE	<5	ppb	C3
		TRICHLOROETHENE	<5	ppb	C3
		1,1,2-TRICHLOROETHANE	<5	ppb	C3
		1,1,1,2-TETRACHLOROETHANE	<5	ppb	C3
		TETRACHLOROETHENE	<5	ppb	C3
		1,1,2,2-TETRACHLOROETHANE	<5	ppb	C3
		CHLOROBENZENE	<5	ppb	C3
		BENZENE	<5	ppb	C3
		TOLUENE	<5	ppb	C3
		ETHYLBENZENE	<5	ppb	C3
		BROMOBENZENE	<5	ppb	C3
		ISOPROPYLBENZENE	<5	ppb	C3
		STYRENE	<5	ppb	C3
		O-XYLENE	<5	ppb	C3
		n-PROPYLBENZENE	<5	ppb	C3

This report is continued on the next page....

Continuation of report of PBS & J SITE SURVEY PROJECT

SAMPLE	DESCRIPTION	PARAMETER	RESULTS	UNITS	LAB
		p-XYLENE/m-XYLENE	<5	ppb	C3
		APPENDIX IX- ACID COMPOUNDS	.		GE
		m-CRESOL	<10.0	ppb	GE
		2-METHYL-4,6-DINITROPHENOL	<50.0	ppb	GE
		o-CRESOL	<10.0	ppb	GE
		p-CRESOL	<10.0	ppb	GE
		2,4,5-TRICHLOROPHENOL	<10.0	ppb	GE
		PENTACHLOROPHENOL	<10.0	ppb	GE
		2,4- DINITROPHENOL	<45.0	ppb	GE
		2,4,6- TRICHLOROPHENOL	<10.0	ppb	GE
		2,4- DICHLOROPHENOL	<10.0	ppb	GE
		2,4- DIMETHYLPHENOL	<10.0	ppb	GE
		2-NITROPHENOL	<10.0	ppb	GE
		4-NITROPHENOL	<56.9	ppb	GE
		2- CHLOROPHENOL	<10.0	ppb	GE
		PHENOLS	<10.0	ppb	GE
		2,3,4,6- TETRACHLOROPHENOL	<10.0	ppb	GE
		2,6- DICHLOROPHENOL	<10.0	ppb	GE
		2-SEC-BUTYL-4,6-DINITROPHENOL	<10.0	ppb	GE
		4-CHLORO-3-METHYL PHENOL	<10.0	ppb	GE
		HEXAACLOROPHENE	<22.1	ppb	GE

ID	LABORATORY TEST LOCATION	NUMBER	ID	LABORATORY TEST LOCATION	NUMBER
C1=	Columbia-inorganics	32114	C2=	Columbia-metals	32114
C3=	Columbia-organics	32114	GE=	Lab Certification #	10120

Respectfully submitted,  
Columbia Analytical Laboratories, Inc.

Mark W. Gilbert  
Project Director

## **Appendix C-1**

### **Slug Tests**

**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

**PROJECT DATA INPUT**

RJH 12/01/92  
Rev. 1.3

Site Name: Kings Laboratory  
Location: Blythewood, South Carolina  
Project No: 18-082.10  
Data Collected By: R. Hunt Date: 10/20/92  
Data Analyzed By: R. Hunt Date: 11/25/92

**TEST WELL DATA INPUT**

Well No: EDW-1 Test Type: 2  
Method: HERMIT 1000 and 10 PSI Pressure Transducer  
Total Depth of Well From Measuring Point: 21.31 ft  
Static Depth To Water From Measuring Point: 1.82 ft  
Depth To Top Of Screen From Measuring Point: 16.31 ft  
Length Of Screen: 5.00 ft  
Radius Of Hole: 0.333 ft  
Radius Of Casing: 0.083 ft  
Aquifer Thickness: 19.49 ft (estimated)  
Porosity Of Sandpack: 0.40 as a decimal

**CALCULATED TEST WELL PARAMETERS**

Le=	5.00 ft (effective screen length of well)	
Lw=	19.49 ft (saturated thickness penetrated by well)	
rw=	0.333 ft (radius of borehole)	
rc=	0.083 ft (radius of casing)	
rc'=	0.083 ft (effective casing radius for partially saturated screens)	
H=	19.49 ft (aquifer thickness)	
Le/Rw=	15.00 dimensionless	
ln(H-Lw)= (raw)	0.00 dimensionless	ln(Re/rw)= 2.47 dimensionless (if Lw < H)
ln(H-Lw)= (<or=6)	0.00 dimensionless	ln(Re/rw)= 2.73 dimensionless (if Lw = H)
A=	2.03 dimensionless	ln(Re/rw)= 2.73 dimensionless
B=	0.32 dimensionless	
C=	1.44 dimensionless	(final)

**REGRESSION ANALYSIS INPUT**

Time T1 = 0.2833 min (time that regression analysis starts)  
Time T2 = 84.0000 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:  
Constant 0.56714073  
Std Err of Y Est 0.00170789  
R Squared 0.98946611  
No. of Observations 77  
Degrees of Freedom 75  
  
X Coefficient(s) -0.00060623985228  
Std Err of Coef. 7.2228376272E-06

**OUTPUT FROM BEST FIT LINE**

Yo = 3.6910 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)  
t= 84.0000 min (= time t, where t>0, at which Yt will be selected)  
Yt= 3.2826 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

K= 4.41E-08 ft/sec	K= 1.34E-06 cm/sec
K= 2.64E-06 ft/min	K= 1.34E-08 m/sec
K= 3.81E-03 ft/day	K= 1.16E-03 m/day
K= 2.85E-02 gpd/ft^2	T= 0.55 gpd/ft, or 0.07 ft^2/day

**REFERENCES**

Bouwer, H. and Rice, R.C., 1976, A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells: Water Resources Research, v.12, pp. 423-428.

Bouwer, H., 1989, The Bouwer and Rice slug test – an update: Ground Water, v.27, no.3, pp. 304-309.

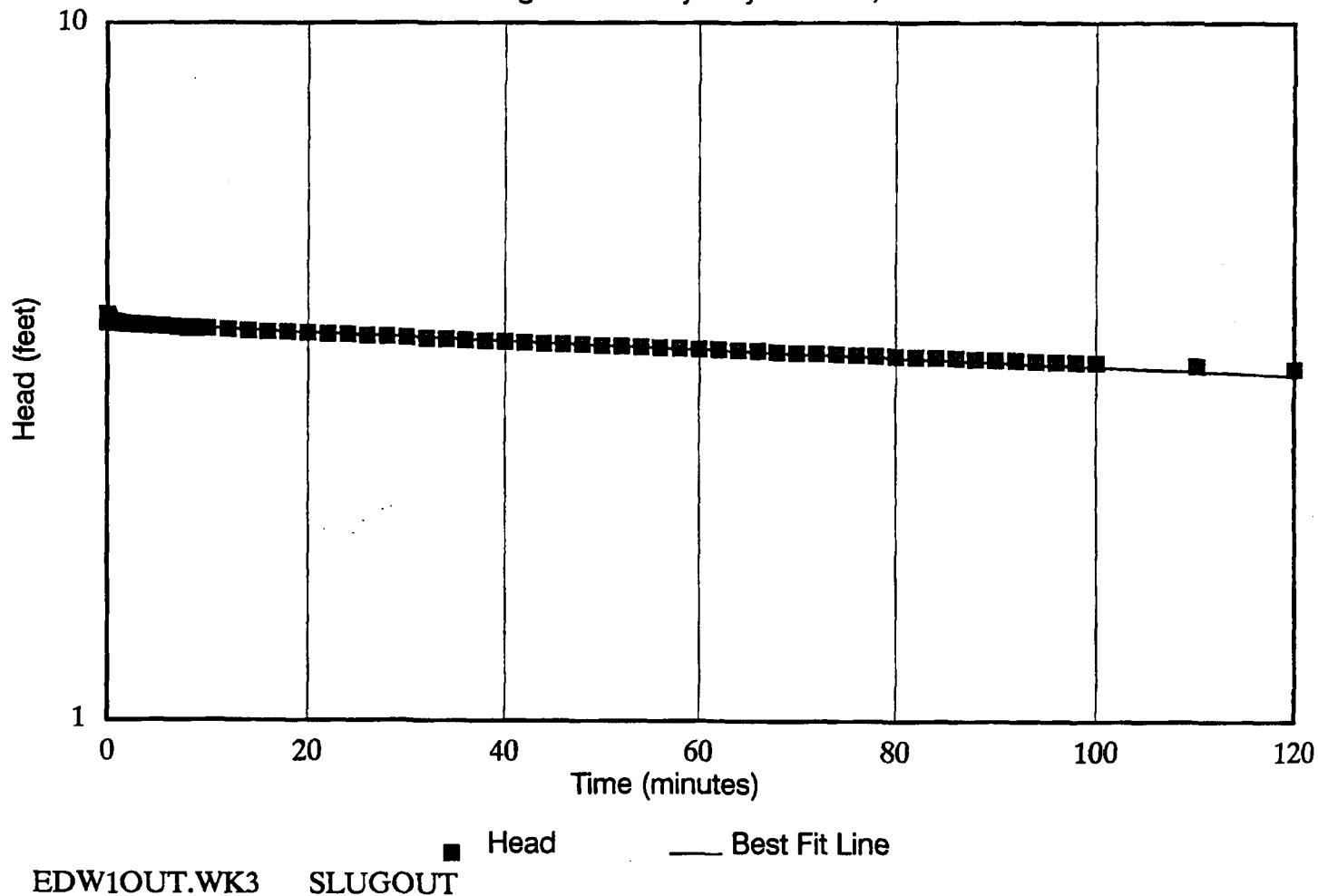
Bouwer, H., 1989, DISCUSSION OF The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory	
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head Log(y)	(Best Fit Line)	EDW-1	Slug Out Page 2
0.0000	1.82	0.00	ERR	3.69		
0.0300	5.51	3.69	0.56714	3.69		
0.0333	5.62	3.80	0.57967	3.69		
0.0500	5.59	3.77	0.57634	3.69		
0.0666	5.58	3.76	0.57496	3.69		
0.0833	5.57	3.75	0.57380	3.69		
0.1000	5.57	3.75	0.57345	3.69		
0.1166	5.56	3.74	0.57276	3.69		
0.1333	5.56	3.74	0.57276	3.69		
0.1500	5.55	3.73	0.57194	3.69		
0.1666	5.55	3.73	0.57194	3.69		
0.1833	5.55	3.73	0.57159	3.69		
0.2000	5.55	3.73	0.57159	3.69		
0.2166	5.55	3.73	0.57124	3.69		
0.2333	5.55	3.73	0.57124	3.69		
0.2500	5.55	3.73	0.57124	3.69		
0.2666	5.54	3.72	0.57089	3.69		
0.2833	5.54	3.72	0.57089	3.69		
0.3000	5.54	3.72	0.57089	3.69		
0.3166	5.54	3.72	0.57054	3.69		
0.3333	5.54	3.72	0.57054	3.69		
0.4166	5.54	3.72	0.57008	3.69		
0.5000	5.53	3.71	0.56972	3.69		
0.5833	5.53	3.71	0.56937	3.69		
0.6666	5.53	3.71	0.56902	3.69		
0.7500	5.53	3.71	0.56902	3.69		
0.8333	5.52	3.70	0.56867	3.69		
0.9166	5.52	3.70	0.56832	3.69		
1.0000	5.52	3.70	0.56785	3.69		
1.0833	5.52	3.70	0.56785	3.69		
1.1666	5.51	3.69	0.56750	3.68		
1.2500	5.51	3.69	0.56714	3.68		
1.3333	5.51	3.69	0.56714	3.68		
1.4166	5.51	3.69	0.56679	3.68		
1.5000	5.51	3.69	0.56679	3.68		
1.5833	5.51	3.69	0.56644	3.68		
1.6666	5.51	3.69	0.56644	3.68		
1.7500	5.50	3.68	0.56608	3.68		
1.8333	5.50	3.68	0.56608	3.68		
1.9166	5.50	3.68	0.56608	3.68		
2.0000	5.50	3.68	0.56561	3.68		
2.5000	5.50	3.68	0.56526	3.68		
3.0000	5.49	3.67	0.56455	3.68		
3.5000	5.49	3.67	0.56455	3.67		
4.0000	5.49	3.67	0.56419	3.67		
4.5000	5.48	3.66	0.56336	3.67		
5.0000	5.48	3.66	0.56301	3.67		
5.5000	5.47	3.65	0.56265	3.66		
6.0000	5.47	3.65	0.56229	3.66		
6.5000	5.47	3.65	0.56194	3.66		
7.0000	5.46	3.64	0.56158	3.66		
7.5000	5.46	3.64	0.56110	3.65		
8.0000	5.45	3.63	0.56003	3.65		
8.5000	5.45	3.63	0.56038	3.65		
9.0000	5.45	3.63	0.56003	3.64		
9.5000	5.45	3.63	0.55967	3.64		
10.0000	5.45	3.63	0.55931	3.64		
12.0000	5.44	3.62	0.55811	3.63		
14.0000	5.42	3.60	0.55654	3.62		
16.0000	5.41	3.59	0.55546	3.61		
18.0000	5.41	3.59	0.55473	3.60		
20.0000	5.40	3.58	0.55352	3.59		
22.0000	5.38	3.56	0.55194	3.58		
24.0000	5.38	3.56	0.55121	3.57		
26.0000	5.37	3.55	0.54962	3.56		
28.0000	5.36	3.54	0.54851	3.55		
30.0000	5.35	3.53	0.54728	3.54		
32.0000	5.33	3.51	0.54531	3.53		
34.0000	5.33	3.51	0.54494	3.52		

36.0000	5.32	3.50	0.54345	3.51
38.0000	5.31	3.49	0.54220	3.50
40.0000	5.30	3.48	0.54108	3.49
42.0000	5.29	3.47	0.53983	3.48
44.0000	5.28	3.46	0.53908	3.47
46.0000	5.27	3.45	0.53782	3.46
48.0000	5.26	3.44	0.53706	3.45
50.0000	5.25	3.43	0.53580	3.44
52.0000	5.25	3.43	0.53504	3.43
54.0000	5.24	3.42	0.53390	3.42
56.0000	5.23	3.41	0.53301	3.41
58.0000	5.22	3.40	0.53186	3.40
60.0000	5.22	3.40	0.53097	3.39
62.0000	5.21	3.39	0.52982	3.38
64.0000	5.20	3.38	0.52905	3.38
66.0000	5.19	3.37	0.52776	3.37
68.0000	5.18	3.36	0.52660	3.36
70.0000	5.18	3.36	0.52569	3.35
72.0000	5.17	3.35	0.52492	3.34
74.0000	5.16	3.34	0.52362	3.33
76.0000	5.15	3.33	0.52244	3.32
78.0000	5.14	3.32	0.52166	3.31
80.0000	5.13	3.31	0.52035	3.30
82.0000	5.13	3.31	0.51957	3.29
84.0000	5.12	3.30	0.51865	3.28
86.0000	5.12	3.30	0.51786	3.27
88.0000	5.11	3.29	0.51667	3.26
90.0000	5.10	3.28	0.51574	3.26
92.0000	5.09	3.27	0.51495	3.25
94.0000	5.09	3.27	0.51415	3.24
96.0000	5.08	3.26	0.51282	3.23
98.0000	5.07	3.25	0.51202	3.22
100.0000	5.06	3.24	0.51108	3.21
110.0000	5.03	3.21	0.50691	3.17
120.0000	5.00	3.18	0.50215	3.12

Kings Laboratory  
 EDW-1      Slug Out  
 Page 3

**EDW-1 SLUG TEST ANALYSIS – SLUG OUT**  
Kings Laboratory Blythewood, SC



**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

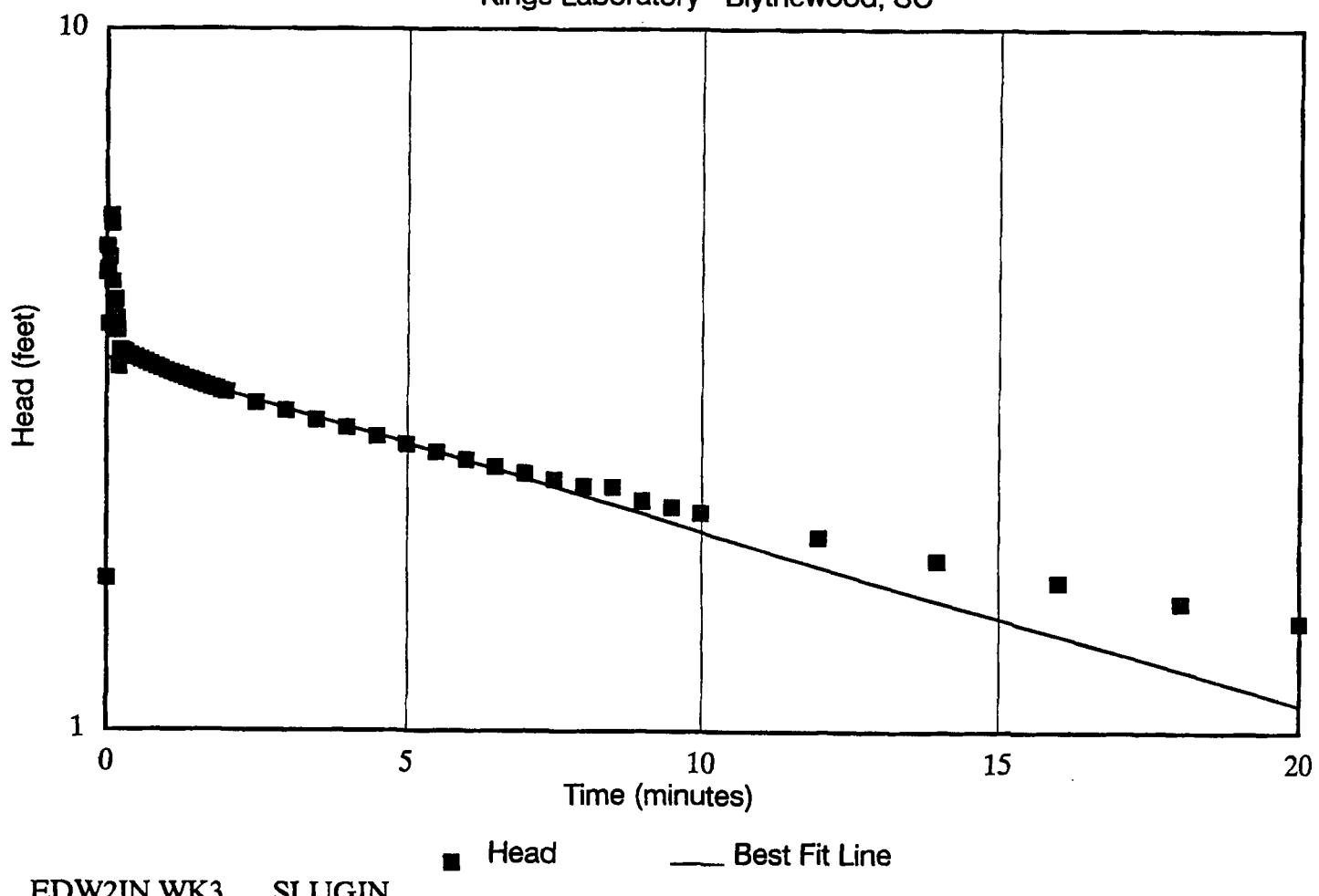
<b>PROJECT DATA INPUT</b>		RJH 12/01/92 Rev. 1.3	
Site Name:	Kings Laboratory		
Location:	Blythewood, South Carolina		
Project No:	18-082.10		
Data Collected By:	L. Blakley	Date: 10/22/92	
Data Analyzed By:	R. Hunt	Date: 12/02/92	
<b>TEST WELL DATA INPUT</b>			
Well No:	EDW-2	Test Type: 1	
Method:	HERMIT 1000 and 10 PSI Pressure Transducer		
Total Depth of Well From Measuring Point:	19.21 ft	1 = Slug In	
Static Depth To Water From Measuring Point:	5.14 ft	2 = Slug Out	
Depth To Top Of Screen From Measuring Point:	14.21 ft		
Length Of Screen:	5.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	14.77 ft		
Porosity Of Sandpack:	0.40 as a decimal		
<b>CALCULATED TEST WELL PARAMETERS</b>			
Le=	5.00 ft (effective screen length of well)		
Lw=	14.07 ft (saturated thickness penetrated by well)		
rw=	0.333 ft (radius of borehole)		
rc=	0.083 ft (radius of casing)		
rc'=	0.083 ft (effective casing radius for partially saturated screens)		
H=	14.77 ft (aquifer thickness)		
Le/Rw=	15.00 dimensionless		
ln(H-Lw)= (raw)	0.74 dimensionless	ln(Re/rw)= (if Lw<H)	2.25 dimensionless
ln(H-Lw)= (<or=6)	0.74 dimensionless	ln(Re/rw)= (if Lw=H)	2.56 dimensionless
A=	2.03 dimensionless	ln(Re/rw)=	2.25 dimensionless
B=	0.32 dimensionless		
C=	1.44 dimensionless		
<b>REGRESSION ANALYSIS INPUT</b>			
Time T1 =	1.0667 min (time that regression analysis starts)		
Time T2 =	6.9834 min (time that regression analysis ends)		
<b>REGRESSION ANALYSIS OUTPUT</b>			
Regression Output:			
Constant	0.52964427		
Std Err of Y Est	0.00277879		
R Squared	0.99671297		
No. of Observations	22		
Degrees of Freedom	20		
X Coefficient(s)	-0.0245392703856		
Std Err of Coef.	0.000315110771764		
<b>OUTPUT FROM BEST FIT LINE</b>			
Yo =	3.3857 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)		
t=	6.9834 min (= time t, where t>0, at which Yt will be selected)		
Yt=	2.2818 ft (= head y @ time t, derived from best fit line of y/t plot)		
<b>CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY</b>			
K=	1.47E-06 ft/sec	K=	4.48E-05 cm/sec
K=	8.82E-05 ft/min	K=	4.48E-07 m/sec
K=	1.27E-01 ft/day	K=	3.87E-02 m/day
K=	9.50E-01 gpd/ft ^ 2	T=	14 gpd/ft, or 1.9 ft ^ 2/day
<b>REFERENCES</b>			
Bouwer, H. and Rice, R.C., 1976, A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells: Water Resources Research, v.12, pp. 423-428.			
Bouwer, H., 1989, The Bouwer and Rice slug test – an update: Ground Water, v.27, no.3, pp. 304-309.			
Bouwer, H., 1989, DISCUSSION OF: The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715			

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory	
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head Log(y)	(Best Fit Line)	EDW-2	Slug In Page 2
0.0000	5.14	0.00	ERR	3.39		
0.0034	4.23	0.91	-0.03905	3.39		
0.0067	3.49	1.65	0.21669	3.38		
0.0100	0.67	4.47	0.64982	3.38		
0.0134	0.26	4.88	0.68815	3.38		
0.0167	0.62	4.52	0.65475	3.38		
0.0334	1.38	3.76	0.57519	3.38		
0.0500	0.43	4.71	0.67293	3.38		
0.0667	-0.26	5.40	0.73223	3.37		
0.0834	-0.11	5.25	0.71983	3.37		
0.1000	0.81	4.33	0.63699	3.37		
0.1167	1.14	4.00	0.60184	3.36		
0.1334	1.09	4.05	0.60767	3.36		
0.1500	1.05	4.09	0.61140	3.36		
0.1667	1.30	3.84	0.58388	3.35		
0.1834	1.45	3.69	0.56750	3.35		
0.2000	1.86	3.28	0.51561	3.35		
0.2167	1.68	3.46	0.53933	3.34		
0.2334	1.68	3.46	0.53895	3.34		
0.2500	1.69	3.46	0.53845	3.34		
0.2667	1.69	3.45	0.53769	3.34		
0.2834	1.69	3.45	0.53732	3.33		
0.3000	1.70	3.44	0.53656	3.33		
0.3167	1.71	3.43	0.53567	3.33		
0.4000	1.73	3.41	0.53212	3.31		
0.4834	1.76	3.38	0.52879	3.29		
0.5667	1.79	3.35	0.52556	3.28		
0.6500	1.81	3.33	0.52231	3.26		
0.7334	1.84	3.30	0.51891	3.25		
0.8167	1.86	3.28	0.51601	3.23		
0.9000	1.88	3.26	0.51308	3.22		
0.9834	1.90	3.24	0.51001	3.20		
1.0667	1.93	3.21	0.50705	3.19		
1.1500	1.94	3.20	0.50488	3.17		
1.2334	1.96	3.18	0.50229	3.16		
1.3167	1.98	3.16	0.49927	3.14		
1.4000	2.00	3.14	0.49665	3.13		
1.4834	2.02	3.12	0.49402	3.11		
1.5667	2.04	3.10	0.49136	3.10		
1.6500	2.06	3.08	0.48911	3.08		
1.7334	2.07	3.07	0.48686	3.07		
1.8167	2.09	3.05	0.48458	3.06		
1.9000	2.11	3.03	0.48187	3.04		
1.9834	2.12	3.02	0.47958	3.03		
2.4834	2.22	2.92	0.46523	2.94		
2.9834	2.30	2.84	0.45286	2.86		
3.4834	2.39	2.75	0.43996	2.78		
3.9834	2.46	2.68	0.42878	2.70		
4.4834	2.53	2.61	0.41681	2.63		
4.9834	2.60	2.54	0.40500	2.55		
5.4834	2.66	2.48	0.39410	2.48		
5.9834	2.72	2.42	0.38346	2.41		
6.4834	2.78	2.36	0.37365	2.35		
6.9834	2.83	2.31	0.36418	2.28		
7.4834	2.88	2.26	0.35507	2.22		
7.9834	2.92	2.22	0.34596	2.16		
8.4834	2.93	2.22	0.34537	2.10		
8.9834	3.02	2.12	0.32613	2.04		
9.4834	3.06	2.08	0.31765	1.98		
9.9834	3.10	2.04	0.30963	1.93		
11.9834	3.25	1.89	0.27600	1.72		
13.9834	3.39	1.75	0.24329	1.54		
15.9834	3.51	1.63	0.21325	1.37		
17.9834	3.61	1.53	0.18355	1.23		
19.9834	3.71	1.43	0.15564	1.09		
21.9834	3.80	1.34	0.12775	0.98		
23.9834	3.88	1.26	0.09899	0.87		
25.9834	3.96	1.18	0.07298	0.78		
27.9834	4.03	1.11	0.04532	0.70		

29.9834	4.10	1.04	0.01870	0.62
31.9834	4.16	0.98	-0.00877	0.56
33.9834	4.22	0.92	-0.03763	0.50
35.9834	4.27	0.87	-0.06248	0.44
37.9834	4.32	0.82	-0.08725	0.40
39.9834	4.37	0.77	-0.11126	0.35
41.9834	4.42	0.72	-0.14267	0.32
43.9834	4.46	0.68	-0.16622	0.28

Kings Laboratory  
EDW-2      Slug In  
                Page 3

**EDW-2 SLUG TEST ANALYSIS – SLUG IN**  
Kings Laboratory Blythewood, SC



EDW2IN.WK3    SLUGIN

**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

**PROJECT DATA INPUT**

Site Name: Kings Laboratory  
 Location: Blythewood, South Carolina  
 Project No: 18-082.10

RJH 12/01/92  
 Rev. 1.3

Data Collected By: L. Blakley Date: 10/22/92  
 Data Analyzed By: R. Hunt Date: 12/02/92

**TEST WELL DATA INPUT**

Well No:	EDW-2	Test Type:	2
Method: HERMIT 1000 and 10 PSI Pressure Transducer			
Total Depth of Well From Measuring Point:	19.21 ft	1 = Slug In	
Static Depth To Water From Measuring Point:	5.14 ft	2 = Slug Out	
Depth To Top Of Screen From Measuring Point:	14.21 ft		
Length Of Screen:	5.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	14.77 ft		
Porosity Of Sandpack:	0.40 as a decimal		

**CALCULATED TEST WELL PARAMETERS**

Le=	5.00 ft (effective screen length of well)		
Lw=	14.07 ft (saturated thickness penetrated by well)		
rw=	0.333 ft (radius of borehole)		
rc=	0.083 ft (radius of casing)		
rc'=	0.083 ft (effective casing radius for partially saturated screens)		
H=	14.77 ft (aquifer thickness)		
Le/Rw=	15.00 dimensionless		
ln(H-Lw)=	0.74 dimensionless	ln(Re/rw)=	2.25 dimensionless
(raw)		(if Lw < H)	
ln(H-Lw)=	0.74 dimensionless	ln(Re/rw)=	2.56 dimensionless
(<or=6)		(if Lw = H)	
A=	2.03 dimensionless	ln(Re/rw)=	2.25 dimensionless
B=	0.32 dimensionless	(final)	
C=	1.44 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T1 = 1.0800 min (time that regression analysis starts)  
 Time T2 = 5.4967 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:	
Constant	0.54551082
Std Err of Y Est	0.00193478
R Squared	0.99490984
No. of Observations	19
Degrees of Freedom	17
X Coefficient(s)	-0.01892963571419
Std Err of Coef.	0.000328391304628

**OUTPUT FROM BEST FIT LINE**

Yo = 3.5116 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)  
 t= 5.4967 min (= time t, where t > 0, at which Yt will be selected)  
 Yt= 2.7635 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

K= 1.13E-06 ft/sec	K= 3.46E-05 cm/sec
K= 6.80E-05 ft/min	K= 3.46E-07 m/sec
K= 9.80E-02 ft/day	K= 2.99E-02 m/day
K= 7.33E-01 gpd/ft <sup>2</sup>	T= 11 gpd/ft, or 1.4 ft <sup>2</sup> /day

**REFERENCES**

Bouwer, H. and Rice, R.C., 1976, A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells: Water Resources Research, v.12, pp. 423–428.

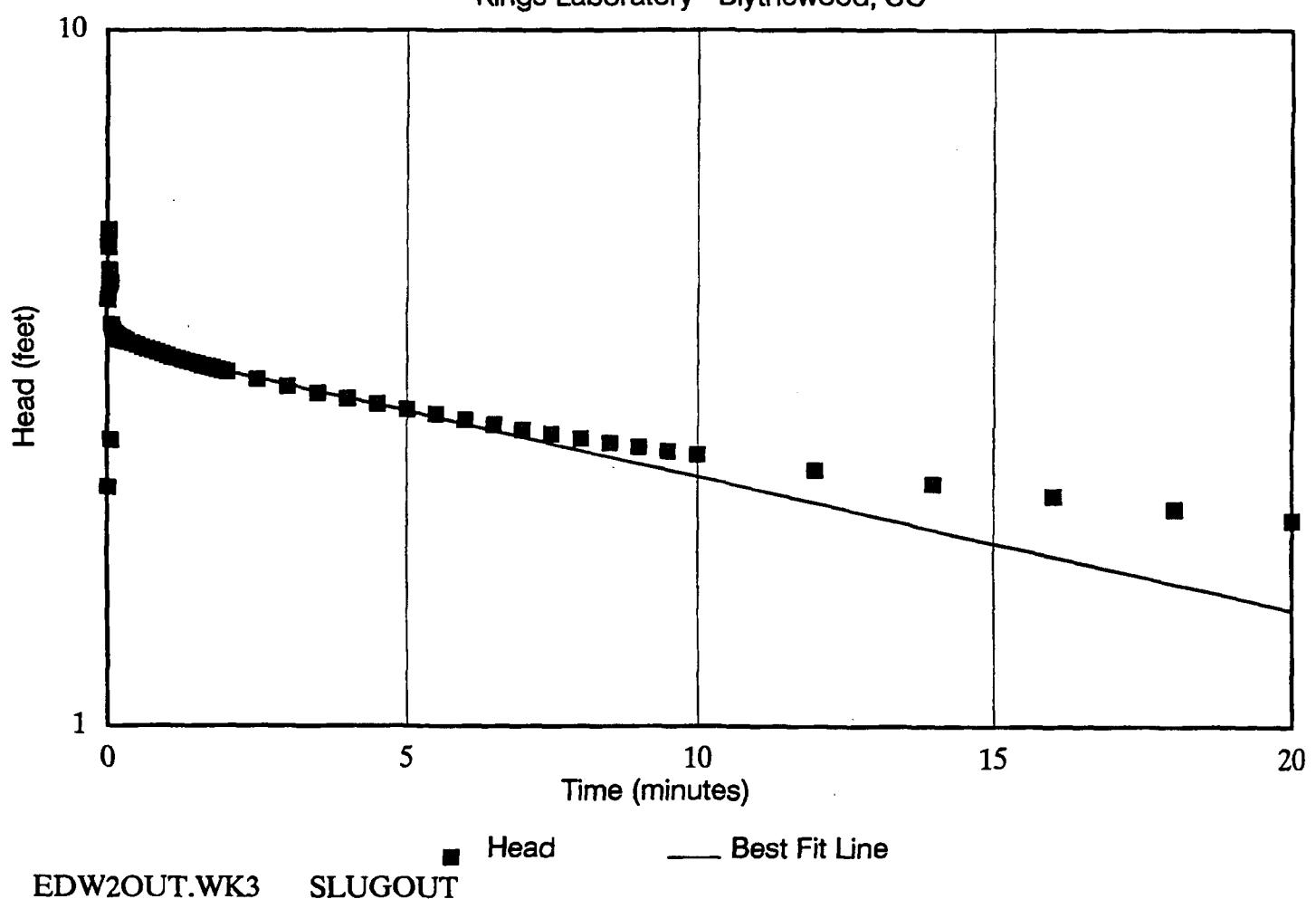
Bouwer, H., 1989, The Bouwer and Rice slug test – an update: Ground Water, v.27, no.3, pp. 304–309.

Bouwer, H., 1989, DISCUSSION OF: The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory	
Time (min.)	Depth be- low MP(ft)	Head (ft)	Log(y)	Head (Best Fit Line)	EDW-2	Slug Out Page 2
0.0000	5.14	0.00	ERR	3.51		
0.0033	5.73	0.59	-0.23136	3.51		
0.0067	7.33	2.19	0.34025	3.51		
0.0100	9.22	4.08	0.61098	3.51		
0.0133	10.12	4.98	0.69697	3.51		
0.0167	10.27	5.13	0.71037	3.51		
0.0200	10.10	4.96	0.69583	3.51		
0.0233	9.99	4.85	0.68574	3.51		
0.0267	9.44	4.30	0.63327	3.51		
0.0300	9.65	4.51	0.65398	3.51		
0.0467	9.48	4.34	0.63719	3.50		
0.0633	7.71	2.57	0.40943	3.50		
0.0800	8.90	3.76	0.57507	3.50		
0.0967	8.84	3.70	0.56773	3.50		
0.1133	8.81	3.67	0.56431	3.49		
0.1300	8.79	3.65	0.56241	3.49		
0.1467	8.78	3.64	0.56098	3.49		
0.1633	8.77	3.63	0.55943	3.49		
0.1800	8.76	3.62	0.55871	3.48		
0.1967	8.75	3.61	0.55751	3.48		
0.2133	8.74	3.60	0.55678	3.48		
0.2300	8.74	3.60	0.55594	3.48		
0.2467	8.73	3.59	0.55522	3.47		
0.2633	8.73	3.59	0.55449	3.47		
0.2800	8.72	3.58	0.55328	3.47		
0.2967	8.71	3.57	0.55255	3.47		
0.3133	8.70	3.56	0.55182	3.46		
0.3300	8.70	3.56	0.55133	3.46		
0.4133	8.67	3.53	0.54790	3.45		
0.4967	8.65	3.51	0.54518	3.44		
0.5800	8.62	3.48	0.54195	3.42		
0.6633	8.60	3.46	0.53958	3.41		
0.7467	8.58	3.45	0.53719	3.40		
0.8300	8.56	3.42	0.53441	3.39		
0.9133	8.55	3.41	0.53237	3.37		
0.9967	8.53	3.39	0.52994	3.36		
1.0800	8.51	3.37	0.52750	3.35		
1.1633	8.49	3.35	0.52543	3.34		
1.2467	8.48	3.34	0.52336	3.33		
1.3300	8.46	3.32	0.52140	3.31		
1.4133	8.45	3.31	0.51970	3.30		
1.4967	8.44	3.30	0.51799	3.29		
1.5800	8.42	3.28	0.51587	3.28		
1.6633	8.40	3.26	0.51375	3.27		
1.7467	8.39	3.25	0.51215	3.25		
1.8300	8.38	3.24	0.51001	3.24		
1.9133	8.36	3.22	0.50826	3.23		
1.9967	8.35	3.21	0.50610	3.22		
2.4967	8.27	3.13	0.49527	3.15		
2.9967	8.20	3.06	0.48586	3.08		
3.4967	8.14	3.00	0.47683	3.02		
3.9967	8.08	2.94	0.46805	2.95		
4.4967	8.03	2.89	0.46045	2.89		
4.9967	7.97	2.83	0.45225	2.82		
5.4967	7.93	2.79	0.44545	2.76		
5.9967	7.88	2.74	0.43743	2.70		
6.4967	7.84	2.70	0.43088	2.65		
6.9967	7.79	2.65	0.42357	2.59		
7.4967	7.75	2.61	0.41731	2.53		
7.9967	7.72	2.58	0.41095	2.48		
8.4967	7.68	2.54	0.40500	2.42		
8.9967	7.65	2.51	0.39898	2.37		
9.4967	7.61	2.47	0.39287	2.32		
9.9967	7.58	2.44	0.38739	2.27		
11.9967	7.46	2.32	0.36530	2.08		
13.9967	7.35	2.21	0.34518	1.91		
15.9967	7.27	2.13	0.32756	1.75		
17.9967	7.18	2.04	0.30963	1.60		
19.9967	7.11	1.97	0.29380	1.47		

					Kings Laboratory
					EDW-2
					Slug Out
					Page 3
21.9967	7.04	1.90	0.27807	1.35	
23.9967	6.98	1.84	0.26411	1.23	
25.9967	6.92	1.78	0.25042	1.13	
27.9967	6.87	1.73	0.23704	1.04	
29.9967	6.82	1.68	0.22479	0.95	
31.9967	6.77	1.63	0.21245	0.87	
33.9967	6.73	1.59	0.20222	0.80	
35.9967	6.70	1.56	0.19173	0.73	
37.9967	6.66	1.52	0.18070	0.67	
39.9967	6.63	1.48	0.17173	0.61	
41.9967	6.60	1.46	0.16316	0.56	
43.9967	6.56	1.42	0.15351	0.52	
45.9967	6.53	1.39	0.14301	0.47	
47.9967	6.50	1.36	0.13481	0.43	
49.9967	6.48	1.34	0.12678	0.40	
51.9967	6.45	1.31	0.11826	0.36	
53.9967	6.43	1.29	0.11193	0.33	
55.9967	6.41	1.27	0.10449	0.31	
57.9967	6.40	1.26	0.09899	0.28	

***EDW-2 SLUG TEST ANALYSIS – SLUG OUT***  
Kings Laboratory Blythewood, SC



**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

RJH 12/01/92  
Rev. 1.3

**PROJECT DATA INPUT**

Site Name: Kings Laboratory  
 Location: Blythewood, South Carolina  
 Project No: 18-082.10

Data Collected By: R. Hunt Date: 10/20/92  
 Data Analyzed By: R. Hunt Date: 11/25/92

**TEST WELL DATA INPUT**

Well No: MW-1 Test Type: 1

Method: HERMIT 1000 and 10 PSI Pressure Transducer

Total Depth of Well From Measuring Point:	38.20 ft	1 = Slug In
Static Depth To Water From Measuring Point:	31.25 ft	2 = Slug Out
Depth To Top Of Screen From Measuring Point:	33.20 ft	
Length Of Screen:	5.00 ft	
Radius Of Hole:	0.333 ft	
Radius Of Casing:	0.083 ft	
Aquifer Thickness:	10.56 ft (estimated)	
Porosity Of Sandpack:	0.40 as a decimal	

**CALCULATED TEST WELL PARAMETERS**

$Le =$  5.00 ft (effective screen length of well)  
 $Lw =$  6.95 ft (saturated thickness penetrated by well)  
 $rw =$  0.333 ft (radius of borehole)  
 $rc =$  0.083 ft (radius of casing)  
 $rc' =$  0.083 ft (effective casing radius for partially saturated screens)  
 $H =$  10.56 ft (aquifer thickness)  
 $Le/Rw =$  15.00 dimensionless

$\ln(H-Lw) =$	2.38 dimensionless	$\ln(Re/rw) =$	1.83 dimensionless
(raw)		(if $Lw < H$ )	
$\ln(H-Lw) =$	2.38 dimensionless	$\ln(Re/rw) =$	2.18 dimensionless
(<or=6)		(if $Lw = H$ )	
$A =$	2.03 dimensionless	$\ln(Re/rw) =$	1.83 dimensionless
$B =$	0.32 dimensionless	(final)	
$C =$	1.44 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T1 = 0.0666 min (time that regression analysis starts)  
 Time T2 = 1.8166 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:

Constant	0.50637352
Std Err of Y Est	0.03124827
R Squared	0.99759929
No. of Observations	30
Degrees of Freedom	28

X Coefficient(s) -1.07436956938511  
 Std Err of Coef. 0.009960155999249

**OUTPUT FROM BEST FIT LINE**

$Yo =$  3.2090 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)  
 $t =$  1.8166 min (= time t, where  $t > 0$ , at which  $Yt$  will be selected)  
 $Yt =$  0.0359 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

$K =$ 5.23E-05 ft/sec	$K =$ 1.59E-03 cm/sec
$K =$ 3.14E-03 ft/min	$K =$ 1.59E-05 m/sec
$K =$ 4.52E+00 ft/day	$K =$ 1.38E+00 m/day
$K =$ 3.38E+01 gpd/ft <sup>2</sup>	$T =$ 357 gpd/ft, or 48 ft <sup>2</sup> /day

**REFERENCES**

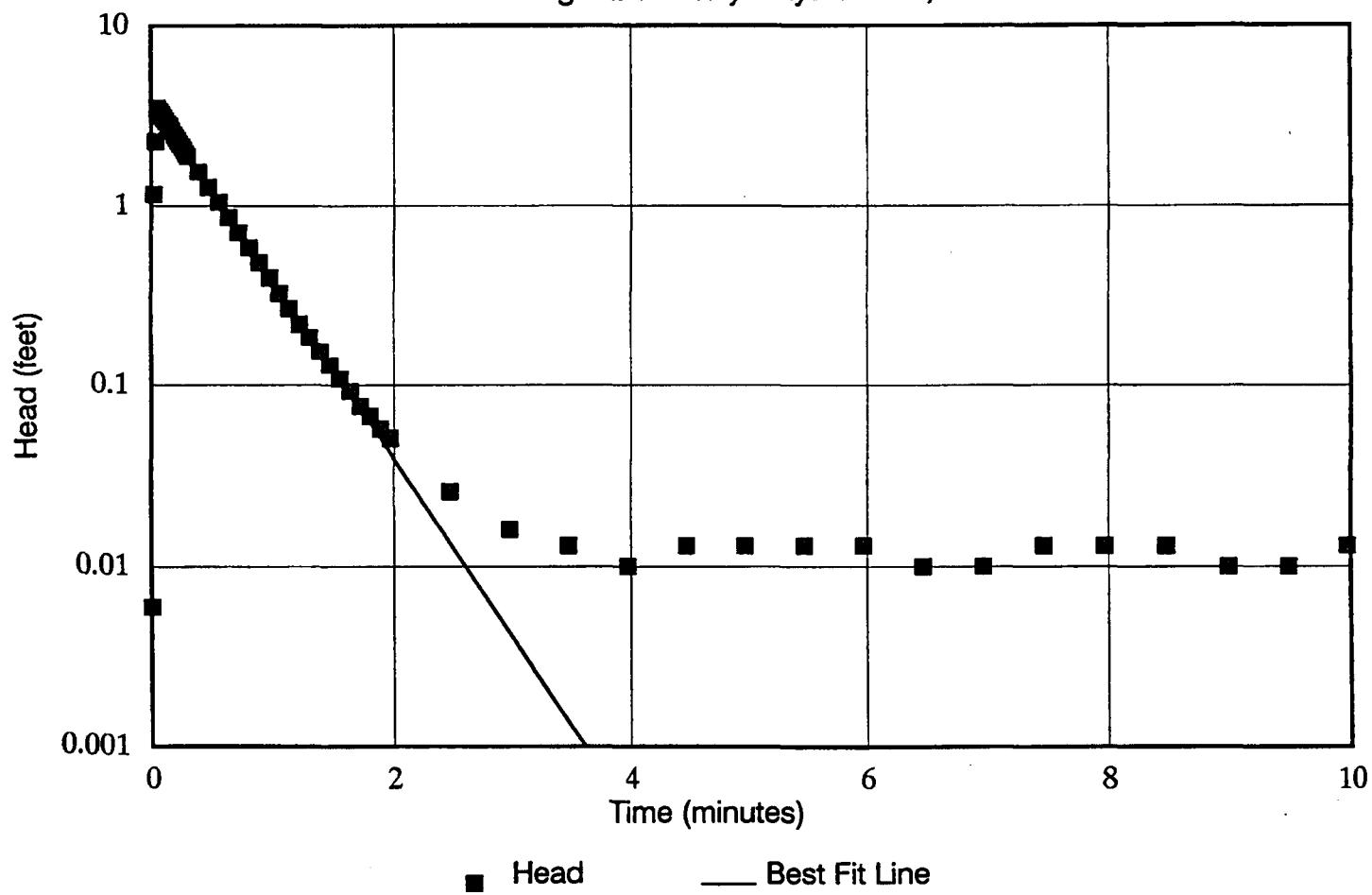
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Bouwer, H., 1989, DISCUSSION OF The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory	
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head Log(y)	(Best Fit Line)	MW-1	Slug In Page 2
0.0000	31.25	0.00	ERR	3.21		
0.0166	30.33	0.92	-0.03668	3.08		
0.0333	28.54	2.71	0.43281	2.96		
0.0500	28.05	3.20	0.50515	2.84		
0.0666	27.70	3.55	0.55011	2.72		
0.0833	28.53	2.72	0.43489	2.61		
0.1000	28.59	2.66	0.42455	2.51		
0.1166	28.83	2.42	0.38399	2.40		
0.1333	29.02	2.23	0.34830	2.31		
0.1500	28.80	2.45	0.38899	2.21		
0.1666	29.12	2.13	0.32818	2.13		
0.1833	29.14	2.11	0.32490	2.04		
0.2000	29.50	1.75	0.24353	1.96		
0.2166	29.42	1.83	0.26198	1.88		
0.2333	29.47	1.78	0.25066	1.80		
0.3166	29.82	1.43	0.15594	1.47		
0.4000	30.11	1.14	0.05690	1.19		
0.4833	30.33	0.92	-0.03668	0.97		
0.5666	30.51	0.74	-0.13018	0.79		
0.6500	30.65	0.60	-0.22040	0.64		
0.7333	30.76	0.49	-0.30892	0.52		
0.8166	30.85	0.40	-0.39903	0.43		
0.9000	30.92	0.33	-0.48678	0.35		
0.9833	30.98	0.27	-0.57025	0.28		
1.0666	31.03	0.22	-0.65365	0.23		
1.1500	31.07	0.18	-0.74473	0.19		
1.2333	31.10	0.15	-0.82681	0.15		
1.3166	31.13	0.12	-0.91009	0.12		
1.4000	31.15	0.10	-0.99568	0.10		
1.4833	31.17	0.09	-1.07058	0.08		
1.5666	31.18	0.07	-1.16115	0.07		
1.6500	31.19	0.06	-1.24413	0.05		
1.7333	31.20	0.05	-1.32790	0.04		
1.8166	31.21	0.04	-1.42022	0.04		
1.9000	31.22	0.04	-1.45593	0.03		
2.4000	31.24	0.01	-2.04576	0.01		
2.9000	31.25	0.00	-2.52288	0.00		
3.4000	31.25	0.00	ERR	0.00		
3.9000	31.25	0.00	-2.52288	0.00		
4.4000	31.25	0.00	-2.52288	0.00		
4.9000	31.25	0.00	-2.52288	0.00		
5.4000	31.25	0.00	-2.52288	0.00		
5.9000	31.25	0.00	-2.52288	0.00		
6.4000	31.25	0.00	-2.52288	0.00		
6.9000	31.25	0.00	-2.52288	0.00		
7.4000	31.25	0.00	ERR	0.00		
7.9000	31.25	0.00	-2.52288	0.00		
8.4000	31.25	0.00	-2.52288	0.00		
8.9000	31.25	0.00	ERR	0.00		
9.4000	31.25	0.00	ERR	0.00		
9.9000	31.25	0.00	-2.52288	0.00		
11.9000	31.24	0.01	-2.15490	0.00		
13.9000	31.24	0.01	-2.15490	0.00		

**MW-1 SLUG TEST ANALYSIS – SLUG OUT**  
Kings Laboratory Blythewood, SC



MW1OUT.WK3

SLUGOUT

**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

**PROJECT DATA INPUT**

Site Name: Kings Laboratory  
 Location: Blythewood, South Carolina  
 Project No: 18-082.10  
 Data Collected By: R. Hunt Date: 10/20/92  
 Data Analyzed By: R. Hunt Date: 11/25/92

RJH 12/01/92  
 Rev. 1.3

**TEST WELL DATA INPUT**

Well No:	MW-1	Test Type:	2
Method: HERMIT 1000 and 10 PSI Pressure Transducer			
Total Depth of Well From Measuring Point:	38.20 ft	1 = Slug In	
Static Depth To Water From Measuring Point:	31.25 ft	2 = Slug Out	
Depth To Top Of Screen From Measuring Point:	33.20 ft		
Length Of Screen:	5.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	10.56 ft (estimated)		
Porosity Of Sandpack:	0.40 as a decimal		

**CALCULATED TEST WELL PARAMETERS**

L <sub>e</sub> =	5.00 ft (effective screen length of well)		
L <sub>w</sub> =	6.95 ft (saturated thickness penetrated by well)		
r <sub>w</sub> =	0.333 ft (radius of borehole)		
r <sub>c</sub> =	0.083 ft (radius of casing)		
r <sub>c'</sub> =	0.083 ft (effective casing radius for partially saturated screens)		
H=	10.56 ft (aquifer thickness)		
L <sub>e</sub> /R <sub>w</sub> =	15.00 dimensionless		
ln(H~L <sub>w</sub> )=	2.38 dimensionless	ln(R <sub>e</sub> /r <sub>w</sub> )=	1.83 dimensionless
(raw)		(if L <sub>w</sub> <H)	
ln(H~L <sub>w</sub> )=	2.38 dimensionless	ln(R <sub>e</sub> /r <sub>w</sub> )=	2.18 dimensionless
(<or=6)		(if L <sub>w</sub> =H)	
A=	2.03 dimensionless	ln(R <sub>e</sub> /r <sub>w</sub> )=	1.83 dimensionless
B=	0.32 dimensionless	(final)	
C=	1.44 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T<sub>1</sub> = 0.0700 min (time that regression analysis starts)  
 Time T<sub>2</sub> = 1.8866 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:	
Constant	0.57813583
Std Err of Y Est	0.01585071
R Squared	0.99929557
No. of Observations	34
Degrees of Freedom	32
X Coefficient(s)	-0.99152205035686
Std Err of Coef.	0.004653700549781

**OUTPUT FROM BEST FIT LINE**

Y<sub>0</sub> = 3.7856 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)  
 t= 1.8866 min (= time t, where t>0, at which Y<sub>t</sub> will be selected)  
 Y<sub>t</sub> = 0.0510 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

K=	4.82E-05 ft/sec	K=	1.47E-03 cm/sec
K=	2.89E-03 ft/min	K=	1.47E-05 m/sec
K=	4.17E+00 ft/day	K=	1.27E+00 m/day
K=	3.12E+01 gpd/ft <sup>2</sup>	T=	329 gpd/ft, or 44 ft <sup>2</sup> /day

**REFERENCES**

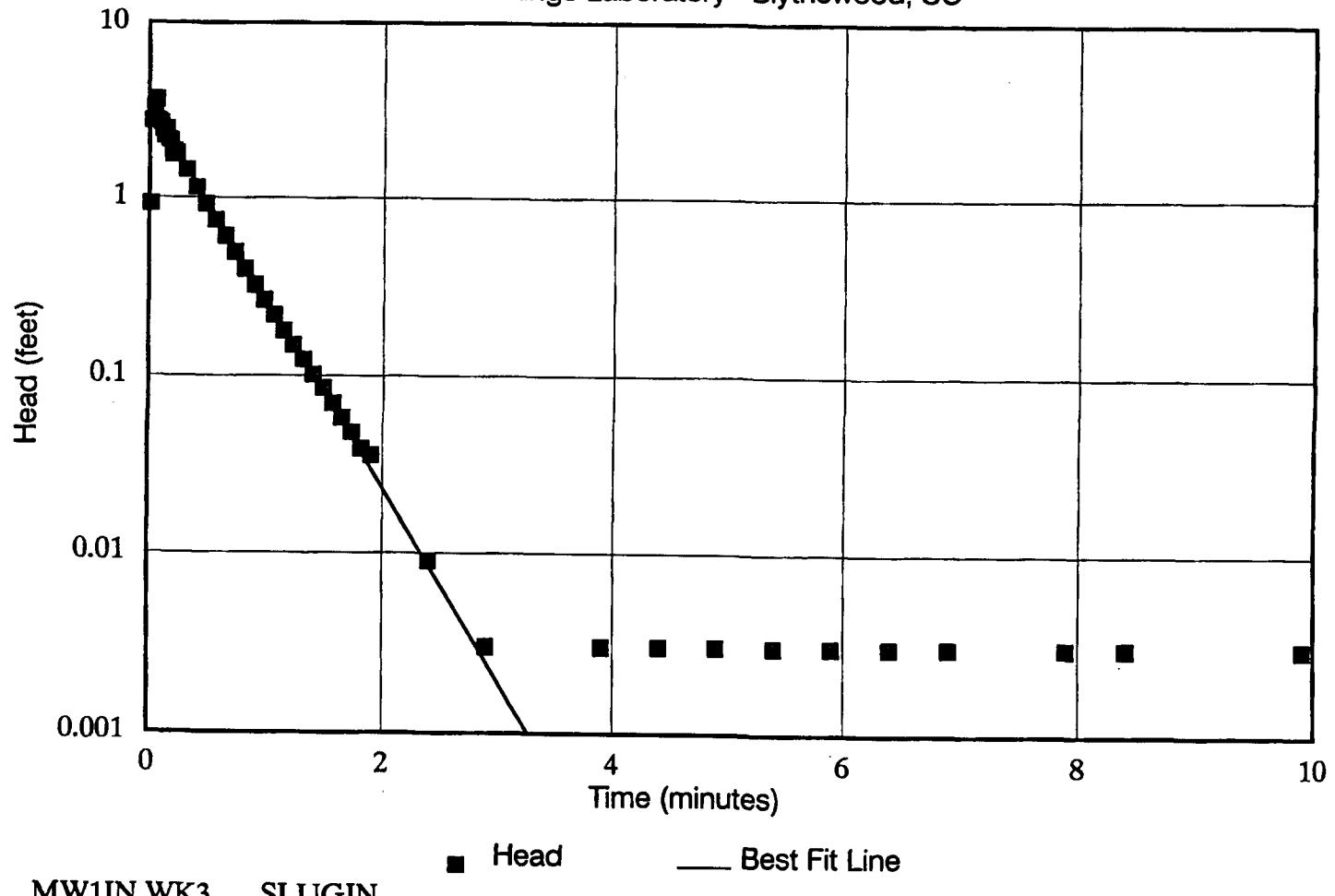
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Bouwer, H., 1989, DISCUSSION OF: The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head (Best Fit Line)	MW-1	Slug Out Page 2
0.0000	31.25	0.00	ERR	3.79	
0.0033	31.26	0.01	-2.22185	3.76	
0.0200	32.41	1.16	0.06333	3.62	
0.0366	33.54	2.29	0.36003	3.48	
0.0533	34.71	3.46	0.53870	3.35	
0.0700	34.57	3.32	0.52114	3.23	
0.0866	34.44	3.19	0.50352	3.11	
0.1033	34.32	3.07	0.48643	2.99	
0.1200	34.20	2.95	0.46982	2.88	
0.1366	34.08	2.83	0.45179	2.77	
0.1533	34.03	2.78	0.44342	2.67	
0.1700	33.88	2.63	0.41996	2.57	
0.1866	33.75	2.50	0.39811	2.47	
0.2033	33.64	2.39	0.37840	2.38	
0.2200	33.56	2.31	0.36361	2.29	
0.2366	33.47	2.22	0.34674	2.21	
0.2533	33.39	2.14	0.32960	2.12	
0.2700	33.30	2.05	0.31197	2.04	
0.2866	33.22	1.97	0.29469	1.97	
0.3033	33.15	1.90	0.27761	1.89	
0.3866	32.80	1.55	0.19117	1.57	
0.4700	32.52	1.27	0.10517	1.29	
0.5533	32.30	1.05	0.01953	1.07	
0.6366	32.11	0.86	-0.06601	0.88	
0.7200	31.95	0.70	-0.15243	0.73	
0.8033	31.83	0.58	-0.23657	0.60	
0.8866	31.73	0.48	-0.31966	0.50	
0.9700	31.65	0.40	-0.40121	0.41	
1.0533	31.58	0.33	-0.48545	0.34	
1.1366	31.52	0.27	-0.56864	0.28	
1.2200	31.47	0.22	-0.65365	0.23	
1.3033	31.44	0.19	-0.72816	0.19	
1.3866	31.41	0.16	-0.80688	0.16	
1.4700	31.38	0.13	-0.88606	0.13	
1.5533	31.36	0.11	-0.96658	0.11	
1.6366	31.34	0.09	-1.03621	0.09	
1.7200	31.33	0.08	-1.11919	0.07	
1.8033	31.32	0.07	-1.17393	0.06	
1.8866	31.31	0.06	-1.24413	0.05	
1.9700	31.30	0.05	-1.29243	0.04	
2.4700	31.28	0.03	-1.58503	0.01	
2.9700	31.27	0.02	-1.79588	0.00	
3.4700	31.26	0.01	-1.88606	0.00	
3.9700	31.26	0.01	-2.00000	0.00	
4.4700	31.26	0.01	-1.88606	0.00	
4.9700	31.26	0.01	-1.88606	0.00	
5.4700	31.26	0.01	-1.88606	0.00	
5.9700	31.26	0.01	-1.88606	0.00	
6.4700	31.26	0.01	-2.00000	0.00	
6.9700	31.26	0.01	-2.00000	0.00	
7.4700	31.26	0.01	-1.88606	0.00	
7.9700	31.26	0.01	-1.88606	0.00	
8.4700	31.26	0.01	-1.88606	0.00	
8.9700	31.26	0.01	-2.00000	0.00	
9.4700	31.26	0.01	-2.00000	0.00	
9.9700	31.26	0.01	-1.88606	0.00	
11.9700	31.27	0.02	-1.79588	0.00	
13.9700	31.26	0.01	-1.88606	0.00	
15.9700	31.26	0.01	-1.88606	0.00	

**MW-1 SLUG TEST ANALYSIS – SLUG IN**  
Kings Laboratory Blythewood, SC



MW1IN.WK3    SLUGIN

**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

RJH 12/01/92  
 Rev. 1.3

**PROJECT DATA INPUT**

Site Name: Kings Laboratory  
 Location: Blythewood, South Carolina  
 Project No: 18-082.10  
 Data Collected By: R. Hunt Date: 10/20/92  
 Data Analyzed By: R. Hunt Date: 11/25/92

**TEST WELL DATA INPUT**

Well No:	MW-2	Test Type:	1
Method:	HERMIT 1000 and 10 PSI Pressure Transducer		
Total Depth of Well From Measuring Point:	36.40 ft		
Static Depth To Water From Measuring Point:	28.50 ft	1 = Slug In	
Depth To Top Of Screen From Measuring Point:	31.40 ft	2 = Slug Out	
Length Of Screen:	5.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	10.53 ft (estimated)		
Porosity Of Sandpack:	0.40 as a decimal		

**CALCULATED TEST WELL PARAMETERS**

L <sub>e</sub> =	5.00 ft (effective screen length of well)		
L <sub>w</sub> =	7.90 ft (saturated thickness penetrated by well)		
r <sub>w</sub> =	0.333 ft (radius of borehole)		
r <sub>c</sub> =	0.083 ft (radius of casing)		
r <sub>c'</sub> =	0.083 ft (effective casing radius for partially saturated screens)		
H=	10.53 ft (aquifer thickness)		
L <sub>e</sub> /R <sub>w</sub> =	15.00 dimensionless		
In(H-L <sub>w</sub> )=	2.07 dimensionless	In(R <sub>c</sub> /r <sub>w</sub> )=	1.90 dimensionless
(raw)		(if L <sub>w</sub> <H)	
In(H-L <sub>w</sub> )=	2.07 dimensionless	In(R <sub>c</sub> /r <sub>w</sub> )=	2.25 dimensionless
(<or=6)		(if L <sub>w</sub> =H)	
A=	2.03 dimensionless	In(R <sub>c</sub> /r <sub>w</sub> )=	1.90 dimensionless
B=	0.32 dimensionless	(final)	
C=	1.44 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T<sub>1</sub> = 1.9867 min (time that regression analysis starts)  
 Time T<sub>2</sub> = 5.4867 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:	
Constant	0.78602669
Std Err of Y Est	0.03096932
R Squared	0.99848024
No. of Observations	8
Degrees of Freedom	6
X Coefficient(s)	-0.60005978457929
Std Err of Coef.	0.009557340796044

**OUTPUT FROM BEST FIT LINE**

Y<sub>0</sub> = 6.1098 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)  
 t = 5.4867 min (= time t, where t>0, at which Y<sub>t</sub> will be selected)  
 Y<sub>t</sub> = 0.0031 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

K=	3.04E-05 ft/sec	K=	9.26E-04 cm/sec
K=	1.82E-03 ft/min	K=	9.26E-06 m/sec
K=	2.62E+00 ft/day	K=	8.00E-01 m/day
K=	1.96E+01 gpd/ft <sup>2</sup>	T=	207 gpd/ft, or 28 ft <sup>2</sup> /day

**REFERENCES**

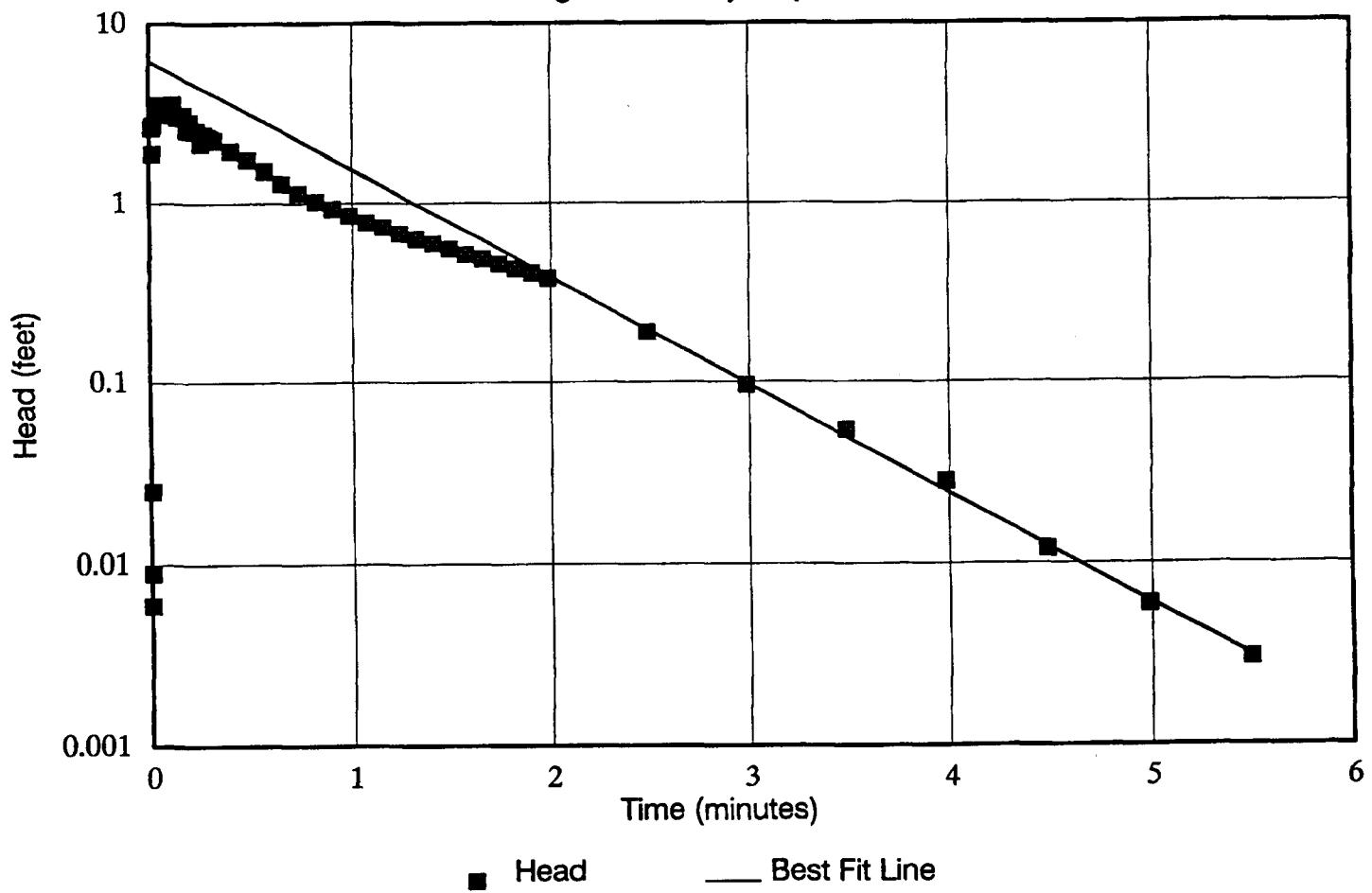
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Bouwer, H., 1989, DISCUSSION OF The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory MW-2	Slug In Page 2
Time (min.)	Depth be- low MP(ft)	Head (ft)	Log(y)	Head (Best Fit Line)		
0.0000	28.50	0.00	ERR	6.11		
0.0033	28.49	0.01	-2.22185	6.08		
0.0067	28.49	0.01	-2.04576	6.05		
0.0100	28.48	0.03	-1.60206	6.03		
0.0133	25.96	2.54	0.40552	6.00		
0.0167	26.63	1.87	0.27091	5.97		
0.0200	25.84	2.66	0.42455	5.94		
0.0367	25.41	3.10	0.49066	5.81		
0.0533	25.07	3.43	0.53542	5.68		
0.0700	25.31	3.19	0.50338	5.55		
0.0867	25.47	3.03	0.48087	5.42		
0.1033	25.32	3.18	0.50297	5.30		
0.1200	25.04	3.46	0.53945	5.18		
0.1367	25.56	2.94	0.46790	5.06		
0.1533	25.56	2.94	0.46835	4.94		
0.1700	25.48	3.02	0.48044	4.83		
0.1867	26.03	2.47	0.39235	4.72		
0.2033	25.76	2.74	0.43838	4.61		
0.2200	26.04	2.46	0.39129	4.51		
0.2367	26.02	2.48	0.39410	4.41		
0.2533	26.39	2.11	0.32366	4.31		
0.2700	26.14	2.36	0.37365	4.21		
0.2867	26.20	2.30	0.36116	4.11		
0.3033	26.26	2.24	0.35083	4.02		
0.3200	26.31	2.19	0.34025	3.93		
0.4033	26.58	1.92	0.28262	3.50		
0.4867	26.78	1.72	0.23553	3.12		
0.5700	26.99	1.51	0.17840	2.78		
0.6533	27.22	1.28	0.10619	2.48		
0.7367	27.37	1.13	0.05231	2.21		
0.8200	27.49	1.01	0.00604	1.97		
0.9033	27.57	0.93	-0.03245	1.75		
0.9867	27.65	0.85	-0.07109	1.56		
1.0700	27.72	0.78	-0.10846	1.39		
1.1533	27.78	0.73	-0.13966	1.24		
1.2367	27.83	0.68	-0.17070	1.11		
1.3200	27.87	0.63	-0.20066	0.99		
1.4033	27.91	0.59	-0.22988	0.88		
1.4867	27.95	0.55	-0.25885	0.78		
1.5700	27.98	0.52	-0.28735	0.70		
1.6533	28.02	0.48	-0.31515	0.62		
1.7367	28.04	0.46	-0.34104	0.55		
1.8200	28.07	0.43	-0.36957	0.49		
1.9033	28.10	0.41	-0.39254	0.44		
1.9867	28.12	0.38	-0.42022	0.39		
2.4867	28.31	0.19	-0.72125	0.20		
2.9867	28.41	0.10	-1.02228	0.10		
3.4867	28.45	0.05	-1.26761	0.05		
3.9867	28.47	0.03	-1.55284	0.02		
4.4867	28.49	0.01	-1.92082	0.01		
4.9867	28.49	0.01	-2.22185	0.01		
5.4867	28.50	0.00	-2.52288	0.00		

**MW-2 SLUG TEST ANALYSIS – SLUG IN**  
Kings Laboratory Blythewood, SC



MW2IN.WK3 SLUGIN

**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

**PROJECT DATA INPUT**

Site Name: Kings Laboratory  
 Location: Blythewood, South Carolina  
 Project No: 18-082.10

RJH 12/01/92  
 Rev. 1.3

Data Collected By: R. Hunt Date: 10/20/92  
 Data Analyzed By: R. Hunt Date: 11/25/92

**TEST WELL DATA INPUT**

Well No:	MW-2	Test Type:	2
Method: HERMIT 1000 and 10 PSI Pressure Transducer			
Total Depth Of Well From Measuring Point:	36.40 ft	1 = Slug In	
Static Depth To Water From Measuring Point:	28.50 ft	2 = Slug Out	
Depth To Top Of Screen From Measuring Point:	31.40 ft		
Length Of Screen:	5.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	10.53 ft (estimated)		
Porosity Of Sandpack:	0.40 as a decimal		

**CALCULATED TEST WELL PARAMETERS**

Le=	5.00 ft (effective screen length of well)		
Lw=	7.90 ft (saturated thickness penetrated by well)		
rw=	0.333 ft (radius of borehole)		
rc=	0.083 ft (radius of casing)		
rc'=	0.083 ft (effective casing radius for partially saturated screens)		
H=	10.53 ft (aquifer thickness)		
Le/Rw=	15.00 dimensionless		
ln(H-Lw)=	2.07 dimensionless	ln(Re/rw)=	1.90 dimensionless
(raw)		(if Lw < H)	
ln(H-Lw)=	2.07 dimensionless	ln(Re/rw)=	2.25 dimensionless
(<or=6)		(if Lw = H)	
A=	2.03 dimensionless	ln(Re/rw)=	1.90 dimensionless
B=	0.32 dimensionless	(final)	
C=	1.44 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T1 = 0.0333 min (time that regression analysis starts)  
 Time T2 = 8.0000 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:	
Constant	0.50753789
Std Err of Y Est	0.00773438
R Squared	0.9998382
No. of Observations	51
Degrees of Freedom	49
X Coefficient(s)	-0.27472711326846
Std Err of Coef.	0.00049925913856

**OUTPUT FROM BEST FIT LINE**

Yo =	3.2176 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)
t=	8.0000 min (= time t, where t>0, at which Yt will be selected)
Yt =	0.0204 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

K=	1.39E-05 ft/sec	K=	4.24E-04 cm/sec
K=	8.34E-04 ft/min	K=	4.24E-06 m/sec
K=	1.20E+00 ft/day	K=	3.66E-01 m/day
K=	8.99E+00 gpd/ft ^2	T=	95 gpd/ft, or 13 ft ^2/day

**REFERENCES**

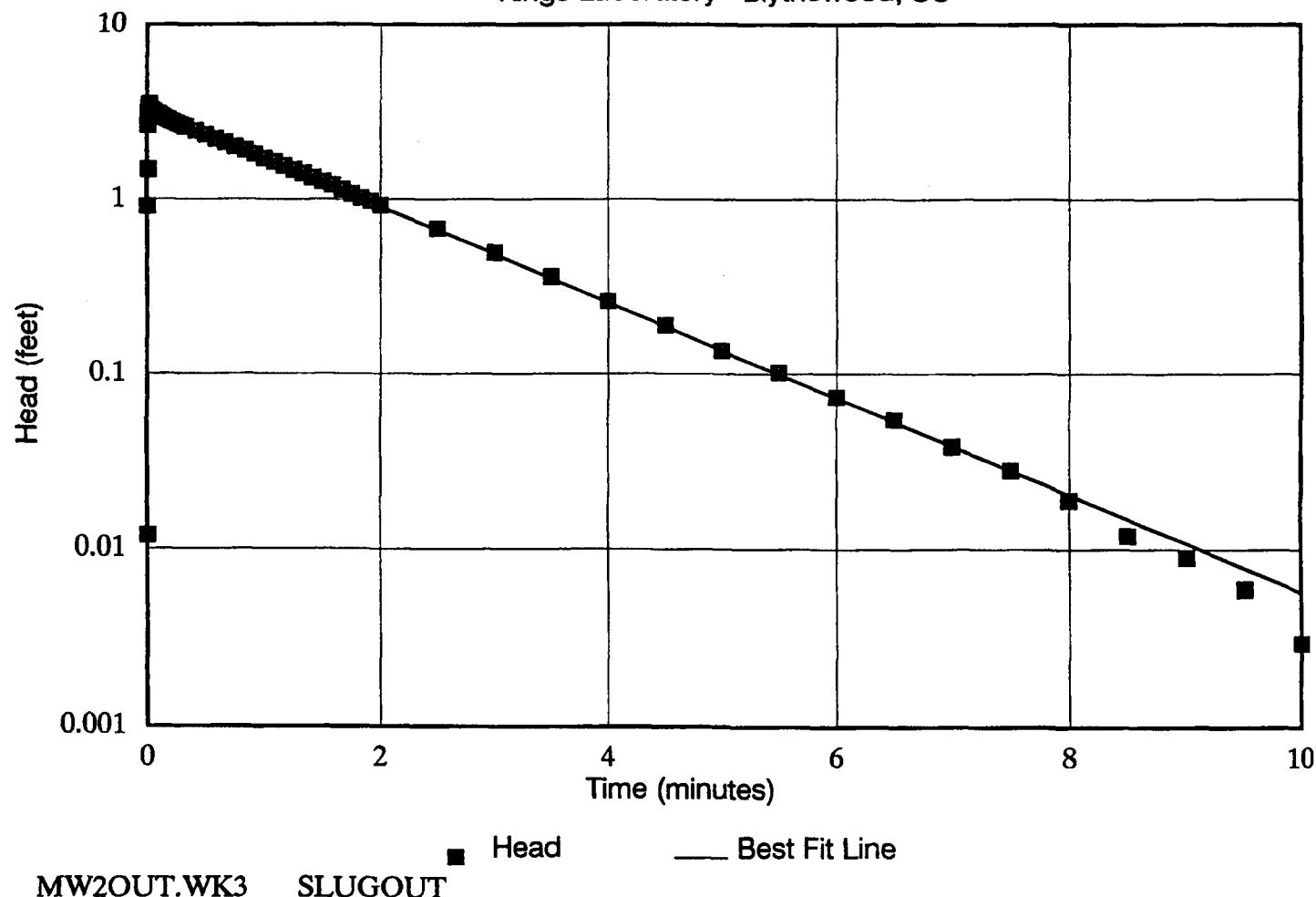
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Bouwer, H., 1989, DISCUSSION OF The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory
Time (min.)	Depth below MP(ft)	Head (ft)	Head (Best Fit Line)	MW-2	Slug Out Page 2
0.0000	28.50	0.00	ERR	3.22	
0.0033	28.51	0.01	-1.92082	3.21	
0.0066	29.41	0.91	-0.04144	3.20	
0.0100	29.97	1.47	0.16643	3.20	
0.0133	31.13	2.63	0.41946	3.19	
0.0166	31.61	3.11	0.49290	3.18	
0.0200	31.42	2.92	0.46464	3.18	
0.0233	32.00	3.50	0.54419	3.17	
0.0266	31.81	3.31	0.52035	3.16	
0.0300	31.83	3.33	0.52244	3.16	
0.0333	31.81	3.31	0.51957	3.15	
0.0500	31.71	3.21	0.50691	3.12	
0.0666	31.65	3.15	0.49817	3.08	
0.0833	31.58	3.08	0.48897	3.05	
0.1000	31.55	3.05	0.48487	3.02	
0.1166	31.49	2.99	0.47538	2.99	
0.1333	31.45	2.95	0.46982	2.96	
0.1500	31.41	2.91	0.46315	2.93	
0.1666	31.37	2.87	0.45743	2.90	
0.1833	31.33	2.83	0.45225	2.87	
0.2000	31.30	2.80	0.44731	2.84	
0.2166	31.27	2.77	0.44232	2.81	
0.2333	31.24	2.74	0.43727	2.78	
0.2500	31.21	2.71	0.43233	2.75	
0.2666	31.18	2.68	0.42765	2.72	
0.2833	31.15	2.65	0.42308	2.69	
0.3000	31.12	2.62	0.41830	2.66	
0.3166	31.09	2.59	0.41363	2.63	
0.3333	31.07	2.57	0.40926	2.61	
0.4166	30.93	2.43	0.38561	2.47	
0.5000	30.81	2.31	0.36361	2.35	
0.5833	30.70	2.20	0.34163	2.22	
0.6666	30.59	2.09	0.31911	2.11	
0.7500	30.48	1.98	0.29732	2.00	
0.8333	30.39	1.89	0.27531	1.90	
0.9166	30.29	1.79	0.25285	1.80	
1.0000	30.20	1.70	0.23070	1.71	
1.0833	30.12	1.62	0.20925	1.62	
1.1666	30.04	1.54	0.18752	1.54	
1.2500	29.96	1.46	0.16435	1.46	
1.3333	29.89	1.39	0.14333	1.38	
1.4166	29.82	1.32	0.12090	1.31	
1.5000	29.75	1.25	0.09830	1.25	
1.5833	29.69	1.19	0.07591	1.18	
1.6666	29.63	1.13	0.05346	1.12	
1.7500	29.57	1.07	0.03100	1.06	
1.8333	29.52	1.02	0.00860	1.01	
1.9166	29.47	0.97	-0.01368	0.96	
2.0000	29.42	0.92	-0.03668	0.91	
2.5000	29.17	0.67	-0.17328	0.66	
3.0000	28.99	0.49	-0.30892	0.48	
3.5000	28.86	0.36	-0.44612	0.35	
4.0000	28.76	0.26	-0.58503	0.26	
4.5000	28.69	0.19	-0.72125	0.19	
5.0000	28.64	0.14	-0.86646	0.14	
5.5000	28.60	0.10	-0.99568	0.10	
6.0000	28.57	0.07	-1.13668	0.07	
6.5000	28.55	0.05	-1.26761	0.05	
7.0000	28.54	0.04	-1.42022	0.04	
7.5000	28.53	0.03	-1.55284	0.03	
8.0000	28.52	0.02	-1.72125	0.02	
8.5000	28.51	0.01	-1.92082	0.01	
9.0000	28.51	0.01	-2.04576	0.01	
9.5000	28.51	0.01	-2.22185	0.01	
10.0000	28.50	0.00	-2.52288	0.01	

**MW-2 SLUG TEST ANALYSIS – SLUG OUT**  
Kings Laboratory Blythewood, SC



**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

RJH 12/01/92  
 Rev. 1.3

**PROJECT DATA INPUT**

Site Name: Kings Laboratory  
 Location: Blythewood, South Carolina  
 Project No: 18-082.10  
 Data Collected By: R. Hunt  
 Date: 10/20/92  
 Data Analyzed By: R. Hunt  
 Date: 12/01/92

**TEST WELL DATA INPUT**

Well No:	MW-3	Test Type:	1
Method: HERMIT 1000 and 10 PSI Pressure Transducer			
Total Depth of Well From Measuring Point:	33.00 ft	1 = Slug In	
Static Depth To Water From Measuring Point:	29.20 ft	2 = Slug Out	
Depth To Top Of Screen From Measuring Point:	29.00 ft		
Length Of Screen:	4.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	12.21 ft (estimated)		
Porosity Of Sandpack:	0.40 as a decimal		

**CALCULATED TEST WELL PARAMETERS**

L <sub>e</sub> =	3.80 ft (effective screen length of well)		
L <sub>w</sub> =	3.80 ft (saturated thickness penetrated by well)		
r <sub>w</sub> =	0.333 ft (radius of borehole)		
r <sub>c</sub> =	0.083 ft (radius of casing)		
r <sub>c'</sub> =	0.220 ft (effective casing radius for partially saturated screens)		
H=	12.21 ft (aquifer thickness)		
L <sub>e</sub> /R <sub>w</sub> =	11.40 dimensionless		
ln(H-L <sub>w</sub> )=(raw)	3.23 dimensionless	ln(R <sub>e</sub> /r <sub>w</sub> )=(if L <sub>w</sub> <H)	1.42 dimensionless
ln(H-L <sub>w</sub> )(<or=6)	3.23 dimensionless	ln(R <sub>e</sub> /r <sub>w</sub> )=(if L <sub>w</sub> =H)	1.77 dimensionless
A=	1.91 dimensionless	ln(R <sub>e</sub> /r <sub>w</sub> )=(final)	1.42 dimensionless
B=	0.30 dimensionless		
C=	1.27 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T1 = 0.0500 min (time that regression analysis starts)  
 Time T2 = 0.2000 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:	
Constant	0.40194967
Std Err of Y Est	0.04269592
R Squared	0.97834541
No. of Observations	10
Degrees of Freedom	8
X Coefficient(s)	-5.36238891479437
Std Err of Coef.	0.282060436523

**OUTPUT FROM BEST FIT LINE**

Y<sub>0</sub> = 2.5232 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)  
 t = 0.2000 min (= time t, where t>0, at which Y<sub>t</sub> will be selected)  
 Y<sub>t</sub> = 0.2135 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

K= 1.87E-03 ft/sec	K= 5.70E-02 cm/sec
K= 1.12E-01 ft/min	K= 5.70E-04 m/sec
K= 1.62E+02 ft/day	K= 4.92E+01 m/day
K= 1.21E+03 gpd/ft <sup>2</sup>	T= 14,754 gpd/ft, or 1,972 ft <sup>2</sup> /day

**REFERENCES**

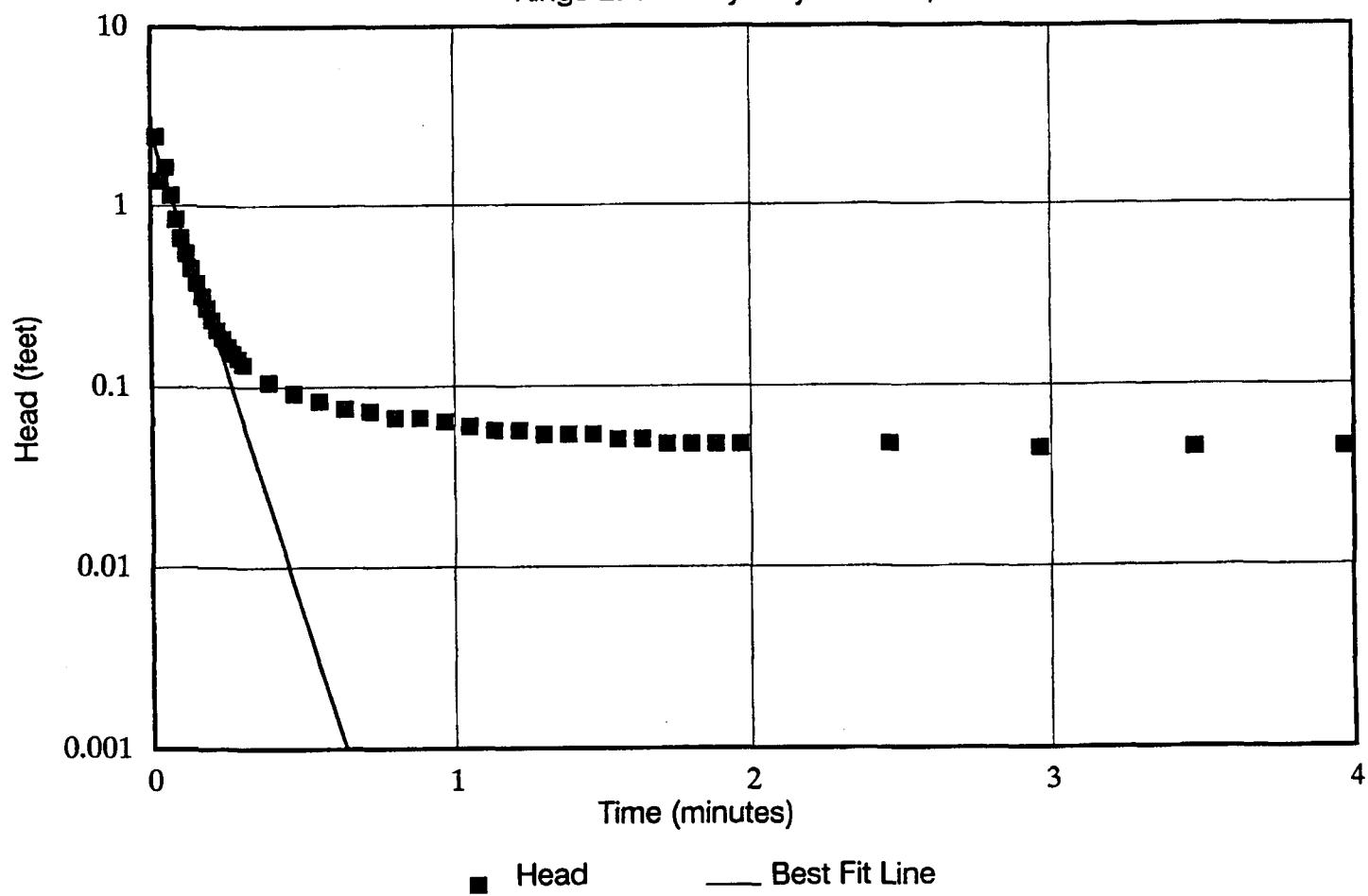
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Bouwer, H., 1989, DISCUSSION OF: The Bouwer and Rice slug test—an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory	
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head Log(y)	(Best Fit Line)	MW-3	Slug In Page 2
0.0000	29.20	0.00	ERR	2.52		
0.0167	26.76	2.44	0.38739	2.05		
0.0333	27.83	1.37	0.13735	1.67		
0.0500	27.57	1.64	0.21352	1.36		
0.0667	28.06	1.14	0.05614	1.11		
0.0833	28.36	0.84	-0.07417	0.90		
0.1000	28.54	0.66	-0.17914	0.73		
0.1167	28.65	0.55	-0.26122	0.60		
0.1333	28.74	0.46	-0.34104	0.49		
0.1500	28.82	0.38	-0.42022	0.40		
0.1667	28.88	0.32	-0.49485	0.32		
0.1833	28.92	0.28	-0.55909	0.26		
0.2000	28.96	0.24	-0.62342	0.21		
0.2167	28.99	0.21	-0.67985	0.17		
0.2333	29.01	0.19	-0.72816	0.14		
0.2500	29.03	0.17	-0.77469	0.12		
0.2667	29.05	0.16	-0.80967	0.09		
0.2833	29.06	0.14	-0.84466	0.08		
0.3000	29.07	0.13	-0.87615	0.06		
0.3833	29.10	0.11	-0.97881	0.02		
0.4667	29.11	0.09	-1.03621	0.01		
0.5500	29.12	0.08	-1.08092	0.00		
0.6333	29.12	0.08	-1.11919	0.00		
0.7167	29.13	0.07	-1.13668	0.00		
0.8000	29.13	0.07	-1.17393	0.00		
0.8833	29.13	0.07	-1.17393	0.00		
0.9667	29.14	0.06	-1.19382	0.00		
1.0500	29.14	0.06	-1.22185	0.00		
1.1333	29.14	0.06	-1.24413	0.00		
1.2167	29.14	0.06	-1.24413	0.00		
1.3000	29.15	0.05	-1.26761	0.00		
1.3833	29.15	0.05	-1.26761	0.00		
1.4667	29.15	0.05	-1.26761	0.00		
1.5500	29.15	0.05	-1.29243	0.00		
1.6333	29.15	0.05	-1.29243	0.00		
1.7167	29.15	0.05	-1.31876	0.00		
1.8000	29.15	0.05	-1.31876	0.00		
1.8833	29.15	0.05	-1.31876	0.00		
1.9667	29.15	0.05	-1.31876	0.00		
2.4667	29.15	0.05	-1.31876	0.00		
2.9667	29.16	0.05	-1.34679	0.00		
3.4667	29.16	0.05	-1.34679	0.00		
3.9667	29.16	0.05	-1.34679	0.00		
4.4667	29.15	0.05	-1.31876	0.00		
4.9667	29.16	0.05	-1.34679	0.00		
5.4667	29.16	0.05	-1.34679	0.00		
5.9667	29.16	0.05	-1.34679	0.00		
6.4667	29.16	0.05	-1.34679	0.00		
6.9667	29.16	0.05	-1.34679	0.00		
7.4667	29.16	0.05	-1.34679	0.00		
7.9667	29.16	0.05	-1.34679	0.00		
8.4667	29.16	0.05	-1.34679	0.00		
8.9667	29.16	0.05	-1.34679	0.00		
9.4667	29.16	0.04	-1.38722	0.00		
9.9667	29.16	0.04	-1.38722	0.00		

**MW-3 SLUG TEST ANALYSIS – SLUG IN**  
Kings Laboratory Blythewood, SC



MW3IN.WK3      SLUGIN

**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

**PROJECT DATA INPUT**

Site Name: Kings Laboratory  
 Location: Blythewood, South Carolina  
 Project No: 18-082.10

RJH 12/01/92  
 Rev. 1.3

Data Collected By: R. Hunt Date: 10/20/92  
 Data Analyzed By: R. Hunt Date: 12/01/92

**TEST WELL DATA INPUT**

Well No:	MW-3	Test Type:	2
Method:	HERMIT 1000 and 10 PSI Pressure Transducer		
Total Depth Of Well From Measuring Point:	33.00 ft		
Static Depth To Water From Measuring Point:	29.20 ft		
Depth To Top Of Screen From Measuring Point:	29.00 ft		
Length Of Screen:	4.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	12.21 ft (estimated)		
Porosity Of Sandpack:	0.40 as a decimal		

**CALCULATED TEST WELL PARAMETERS**

L <sub>e</sub> =	3.80 ft (effective screen length of well)		
L <sub>w</sub> =	3.80 ft (saturated thickness penetrated by well)		
r <sub>w</sub> =	0.333 ft (radius of borehole)		
r <sub>c</sub> =	0.083 ft (radius of casing)		
r <sub>c'</sub> =	0.220 ft (effective casing radius for partially saturated screens)		
H=	12.21 ft (aquifer thickness)		
L <sub>e</sub> /R <sub>w</sub> =	11.40 dimensionless		
ln(H-L <sub>w</sub> )=	3.23 dimensionless	ln(R <sub>e</sub> /r <sub>w</sub> )=	1.42 dimensionless
(raw)		(if L <sub>w</sub> <H)	
ln(H-L <sub>w</sub> )=	3.23 dimensionless	ln(R <sub>e</sub> /r <sub>w</sub> )=	1.77 dimensionless
(<or=6)		(if L <sub>w</sub> =H)	
A=	1.91 dimensionless	ln(R <sub>e</sub> /r <sub>w</sub> )=	1.42 dimensionless
B=	0.30 dimensionless	(final)	
C=	1.27 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T1 = 0.0133 min (time that regression analysis starts)  
 Time T2 = 0.4066 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:	
Constant	0.31679789
Std Err of Y Est	0.0189284
R Squared	0.99630998
No. of Observations	23
Degrees of Freedom	21
X Coefficient(s)	-2.67464337519578
Std Err of Coef.	0.035520042194308

**OUTPUT FROM BEST FIT LINE**

Y<sub>0</sub> = 2.0739 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)  
 t = 0.4066 min (= time t, where t>0, at which Y<sub>t</sub> will be selected)  
 Y<sub>t</sub> = 0.1695 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

K=	9.33E-04 ft/sec	K=	2.84E-02 cm/sec
K=	5.60E-02 ft/min	K=	2.84E-04 m/sec
K=	8.06E+01 ft/day	K=	2.46E+01 m/day
K=	6.03E+02 gpd/ft <sup>2</sup>	T=	7,359 gpd/ft, or 984 ft <sup>2</sup> /day

**REFERENCES**

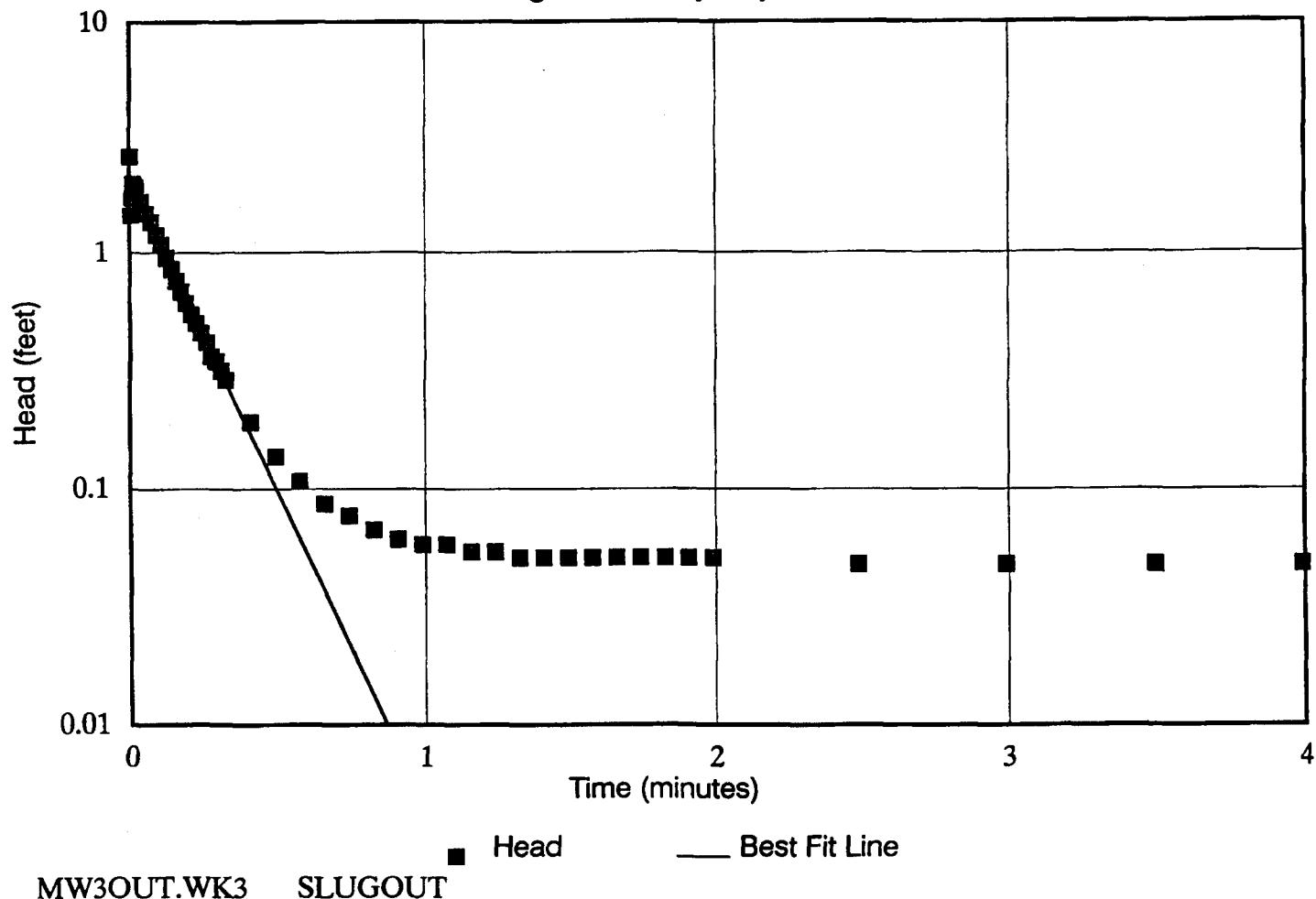
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Bouwer, H., 1989, DISCUSSION OF: The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory	
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head Log(y)	(Best Fit Line)	MW-3	Slug Out Page 2
0.0000	29.20	0.00	ERR	2.07		
0.0033	31.79	2.59	0.41263	2.03		
0.0066	30.65	1.45	0.15987	1.99		
0.0100	30.92	1.72	0.23502	1.95		
0.0133	31.18	1.98	0.29557	1.91		
0.0166	31.13	1.93	0.28488	1.87		
0.0200	31.11	1.90	0.27989	1.83		
0.0233	31.05	1.85	0.26811	1.80		
0.0400	30.86	1.66	0.21958	1.62		
0.0566	30.67	1.47	0.16850	1.46		
0.0733	30.55	1.35	0.13162	1.32		
0.0900	30.39	1.19	0.07518	1.19		
0.1066	30.28	1.08	0.03383	1.08		
0.1233	30.15	0.95	-0.02182	0.97		
0.1400	30.05	0.85	-0.06905	0.88		
0.1566	29.96	0.76	-0.11862	0.79		
0.1733	29.89	0.69	-0.16431	0.71		
0.1900	29.82	0.61	-0.21112	0.64		
0.2066	29.75	0.55	-0.26043	0.58		
0.2233	29.70	0.50	-0.29757	0.52		
0.2400	29.66	0.46	-0.33724	0.47		
0.2566	29.62	0.42	-0.37779	0.43		
0.2733	29.57	0.36	-0.43771	0.39		
0.2900	29.55	0.35	-0.45717	0.35		
0.3066	29.52	0.32	-0.49894	0.31		
0.3233	29.49	0.29	-0.53462	0.28		
0.4066	29.39	0.19	-0.71220	0.17		
0.4900	29.34	0.14	-0.86328	0.10		
0.5733	29.31	0.11	-0.96658	0.06		
0.6566	29.29	0.09	-1.06550	0.04		
0.7400	29.28	0.08	-1.11351	0.02		
0.8233	29.27	0.07	-1.17393	0.01		
0.9066	29.26	0.06	-1.21467	0.01		
0.9900	29.26	0.06	-1.23657	0.00		
1.0733	29.26	0.06	-1.23657	0.00		
1.1566	29.25	0.05	-1.26761	0.00		
1.2400	29.25	0.05	-1.26761	0.00		
1.3233	29.25	0.05	-1.29243	0.00		
1.4066	29.25	0.05	-1.29243	0.00		
1.4900	29.25	0.05	-1.29243	0.00		
1.5733	29.25	0.05	-1.29243	0.00		
1.6566	29.25	0.05	-1.29243	0.00		
1.7400	29.25	0.05	-1.29243	0.00		
1.8233	29.25	0.05	-1.29243	0.00		
1.9066	29.25	0.05	-1.29243	0.00		
1.9900	29.25	0.05	-1.29243	0.00		
2.4900	29.25	0.05	-1.31876	0.00		
2.9900	29.25	0.05	-1.31876	0.00		
3.4900	29.25	0.05	-1.31876	0.00		
3.9900	29.25	0.05	-1.31876	0.00		
4.4900	29.25	0.05	-1.31876	0.00		
4.9900	29.25	0.05	-1.31876	0.00		
5.4900	29.25	0.05	-1.31876	0.00		
5.9900	29.25	0.05	-1.31876	0.00		
6.4900	29.25	0.05	-1.31876	0.00		
6.9900	29.25	0.05	-1.31876	0.00		
7.4900	29.25	0.05	-1.31876	0.00		
7.9900	29.25	0.05	-1.31876	0.00		
8.4900	29.25	0.05	-1.29243	0.00		
8.9900	29.25	0.05	-1.31876	0.00		
9.4900	29.25	0.05	-1.31876	0.00		
9.9900	29.25	0.05	-1.29243	0.00		

**MW-3 SLUG TEST ANALYSIS – SLUG OUT**  
Kings Laboratory Blythewood, SC



**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

**PROJECT DATA INPUT**

RJH 12/01/92  
Rev. 1.3

Site Name: Kings Laboratory  
Location: Blythewood, South Carolina  
Project No: 18-082.10

Data Collected By: R. Hunt Date: 10/20/92  
Data Analyzed By: R. Hunt Date: 11/30/92

**TEST WELL DATA INPUT**

Well No:	MW-4	Test Type:	1
Method:	HERMIT 1000 and 10 PSI Pressure Transducer		
Total Depth of Well From Measuring Point:	37.20 ft		
Static Depth To Water From Measuring Point:	27.65 ft		
Depth To Top Of Screen From Measuring Point:	32.20 ft		
Length Of Screen:	5.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	14.43 ft (estimated)		
Porosity Of Sandpack:	0.40 as a decimal		

**CALCULATED TEST WELL PARAMETERS**

$Le =$	5.00 ft (effective screen length of well)		
$Lw =$	9.55 ft (saturated thickness penetrated by well)		
$rw =$	0.333 ft (radius of borehole)		
$rc =$	0.083 ft (radius of casing)		
$rc' =$	0.083 ft (effective casing radius for partially saturated screens)		
$H =$	14.43 ft (aquifer thickness)		
$Le/Rw =$	15.00 dimensionless		
$\ln(H-Lw) =$	2.68 dimensionless	$\ln(Re/rw) =$	1.92 dimensionless
(raw)		(if $Lw < H$ )	
$\ln(H-Lw) =$	2.68 dimensionless	$\ln(Re/rw) =$	2.36 dimensionless
(<or=6)		(if $Lw = H$ )	
$A =$	2.03 dimensionless	$\ln(Re/rw) =$	1.92 dimensionless
$B =$	0.32 dimensionless	(final)	
$C =$	1.44 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T1 = 0.4500 min (time that regression analysis starts)  
Time T2 = 1.9500 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:	
Constant	-0.3212213
Std Err of Y Est	0.02646912
R Squared	0.98537458
No. of Observations	18
Degrees of Freedom	16
X Coefficient(s)	-0.44728478862566
Std Err of Coef.	0.013623154525415

**OUTPUT FROM BEST FIT LINE**

$Yo =$  0.4773 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)  
 $t =$  1.9500 min (= time t, where t>0, at which Yt will be selected)  
 $Yt =$  0.0641 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

$K =$	2.29E-05 ft/sec	$K =$	6.99E-04 cm/sec
$K =$	1.38E-03 ft/min	$K =$	6.99E-06 m/sec
$K =$	1.98E+00 ft/day	$K =$	6.04E-01 m/day
$K =$	1.48E+01 gpd/ft <sup>2</sup>	$T =$	214 gpd/ft, or 29 ft <sup>2</sup> /day

**REFERENCES**

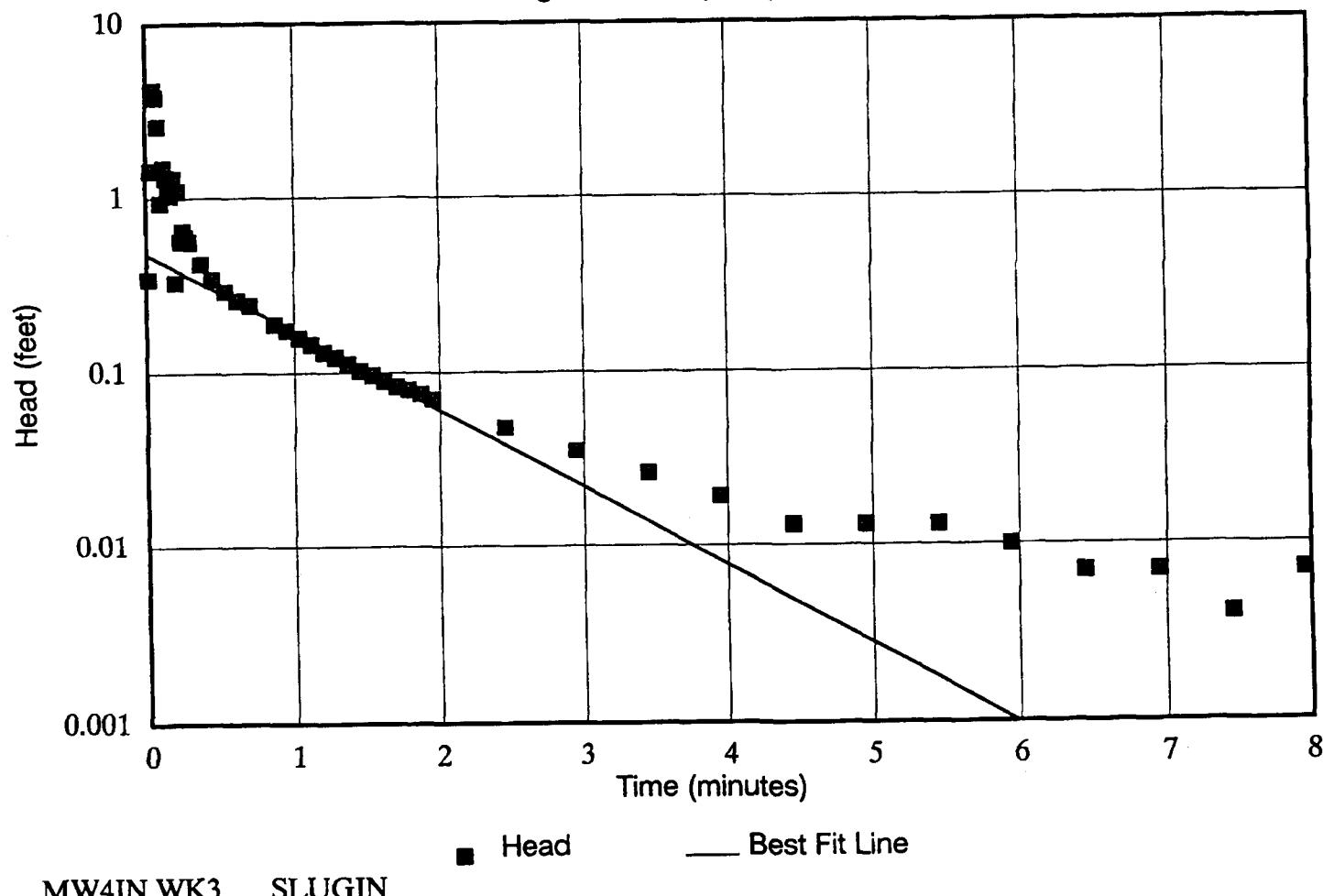
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Bouwer, H., 1989, DISCUSSION OF: The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory	
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head Log(y)	(Best Fit Line)	MW-4	Slug In Page 2
0.0000	27.65	0.00	ERR	0.48		
0.0166	27.31	0.34	-0.46471	0.47		
0.0333	26.23	1.42	0.15320	0.46		
0.0500	23.50	4.15	0.61784	0.45		
0.0666	23.87	3.78	0.57715	0.45		
0.0833	25.08	2.57	0.40993	0.44		
0.1000	26.72	0.93	-0.03058	0.43		
0.1166	26.18	1.47	0.16850	0.42		
0.1333	26.35	1.30	0.11494	0.42		
0.1500	26.57	1.08	0.03383	0.41		
0.1666	26.62	1.03	0.01284	0.40		
0.1833	26.36	1.29	0.10958	0.40		
0.2000	27.32	0.33	-0.48545	0.39		
0.2166	26.56	1.09	0.03623	0.38		
0.2333	27.09	0.56	-0.24872	0.38		
0.2500	27.00	0.65	-0.18910	0.37		
0.2666	27.05	0.60	-0.22257	0.36		
0.2833	27.09	0.56	-0.25104	0.36		
0.3666	27.23	0.42	-0.37779	0.33		
0.4500	27.31	0.34	-0.46852	0.30		
0.5333	27.36	0.29	-0.53910	0.28		
0.6166	27.39	0.26	-0.59007	0.25		
0.7000	27.41	0.24	-0.61798	0.23		
0.8666	27.46	0.19	-0.72816	0.20		
0.9500	27.48	0.17	-0.76447	0.18		
1.0333	27.49	0.16	-0.80688	0.16		
1.1166	27.51	0.14	-0.84466	0.15		
1.2000	27.52	0.13	-0.88606	0.14		
1.2833	27.53	0.12	-0.91721	0.13		
1.3666	27.54	0.11	-0.95468	0.12		
1.4500	27.55	0.10	-0.99140	0.11		
1.5333	27.55	0.10	-1.01773	0.10		
1.6166	27.56	0.09	-1.05061	0.09		
1.7000	27.57	0.08	-1.08092	0.08		
1.7833	27.57	0.08	-1.09691	0.08		
1.8666	27.57	0.08	-1.11919	0.07		
1.9500	27.58	0.07	-1.15490	0.06		
2.4500	27.60	0.05	-1.31876	0.04		
2.9500	27.62	0.04	-1.45593	0.02		
3.4500	27.62	0.03	-1.58503	0.01		
3.9500	27.63	0.02	-1.72125	0.01		
4.4500	27.64	0.01	-1.88606	0.00		
4.9500	27.64	0.01	-1.88606	0.00		
5.4500	27.64	0.01	-1.88606	0.00		
5.9500	27.64	0.01	-2.00000	0.00		
6.4500	27.64	0.01	-2.15490	0.00		
6.9500	27.64	0.01	-2.15490	0.00		
7.4500	27.65	0.00	-2.39794	0.00		
7.9500	27.64	0.01	-2.15490	0.00		
8.4500	27.64	0.01	-2.15490	0.00		
8.9500	27.65	0.00	-2.39794	0.00		
9.4500	27.65	0.00	-2.39794	0.00		
9.9500	27.65	0.00	-2.39794	0.00		

**MW-4 SLUG TEST ANALYSIS – SLUG IN**  
Kings Laboratory Blythewood, SC



MW4IN.WK3    SLUGIN

**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

**PROJECT DATA INPUT**

RJH 12/01/92  
 Rev. 1.3

Site Name: Kings Laboratory  
 Location: Blythewood, South Carolina  
 Project No: 18-082.10

Data Collected By: R. Hunt Date: 10/20/92  
 Data Analyzed By: R. Hunt Date: 11/30/92

**TEST WELL DATA INPUT**

Well No:	MW-4	Test Type:	2
Method: HERMIT 1000 and 10 PSI Pressure Transducer			
Total Depth of Well From Measuring Point:	37.20 ft		
Static Depth To Water From Measuring Point:	27.65 ft	1 = Slug In	
Depth To Top Of Screen From Measuring Point:	32.20 ft	2 = Slug Out	
Length Of Screen:	5.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	14.43 ft (estimated)		
Porosity Of Sandpack:	0.40 as a decimal		

**CALCULATED TEST WELL PARAMETERS**

$L_e$ = 5.00 ft (effective screen length of well)  
 $L_w$ = 9.55 ft (saturated thickness penetrated by well)  
 $r_w$ = 0.333 ft (radius of borehole)  
 $r_c$ = 0.083 ft (radius of casing)  
 $r_c'$ = 0.083 ft (effective casing radius for partially saturated screens)  
 $H$ = 14.43 ft (aquifer thickness)  
 $L_e/R_w$ = 15.00 dimensionless

$\ln(H-L_w)$ =	2.68 dimensionless	$\ln(r_e/r_w)$ =	1.92 dimensionless
(raw)		(if $L_w < H$ )	
$\ln(H-L_w)$ =	2.68 dimensionless	$\ln(r_e/r_w)$ =	2.36 dimensionless
(<or=6)		(if $L_w = H$ )	
$A$ =	2.03 dimensionless	$\ln(r_e/r_w)$ =	1.92 dimensionless
$B$ =	0.32 dimensionless	(final)	
$C$ =	1.44 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T1 = 0.2467 min (time that regression analysis starts)  
 Time T2 = 1.9967 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:

Constant	-0.0306258
Std Err of Y Est	0.0224969
R Squared	0.99557206
No. of Observations	26
Degrees of Freedom	24

X Coefficient(s) -0.56679369417132  
 Std Err of Coef. 0.007715847926072

**OUTPUT FROM BEST FIT LINE**

$Y_0$  = 0.9319 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)  
 $t$  = 1.9967 min (= time t, where t>0, at which  $Y_t$  will be selected)  
 $Y_t$  = 0.0688 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

$K$ = 2.90E-05 ft/sec	$K$ = 8.85E-04 cm/sec
$K$ = 1.74E-03 ft/min	$K$ = 8.85E-06 m/sec
$K$ = 2.51E+00 ft/day	$K$ = 7.65E-01 m/day
$K$ = 1.88E+01 gpd/ft <sup>2</sup>	$T$ = 271 gpd/ft, or 36 ft <sup>2</sup> /day

**REFERENCES**

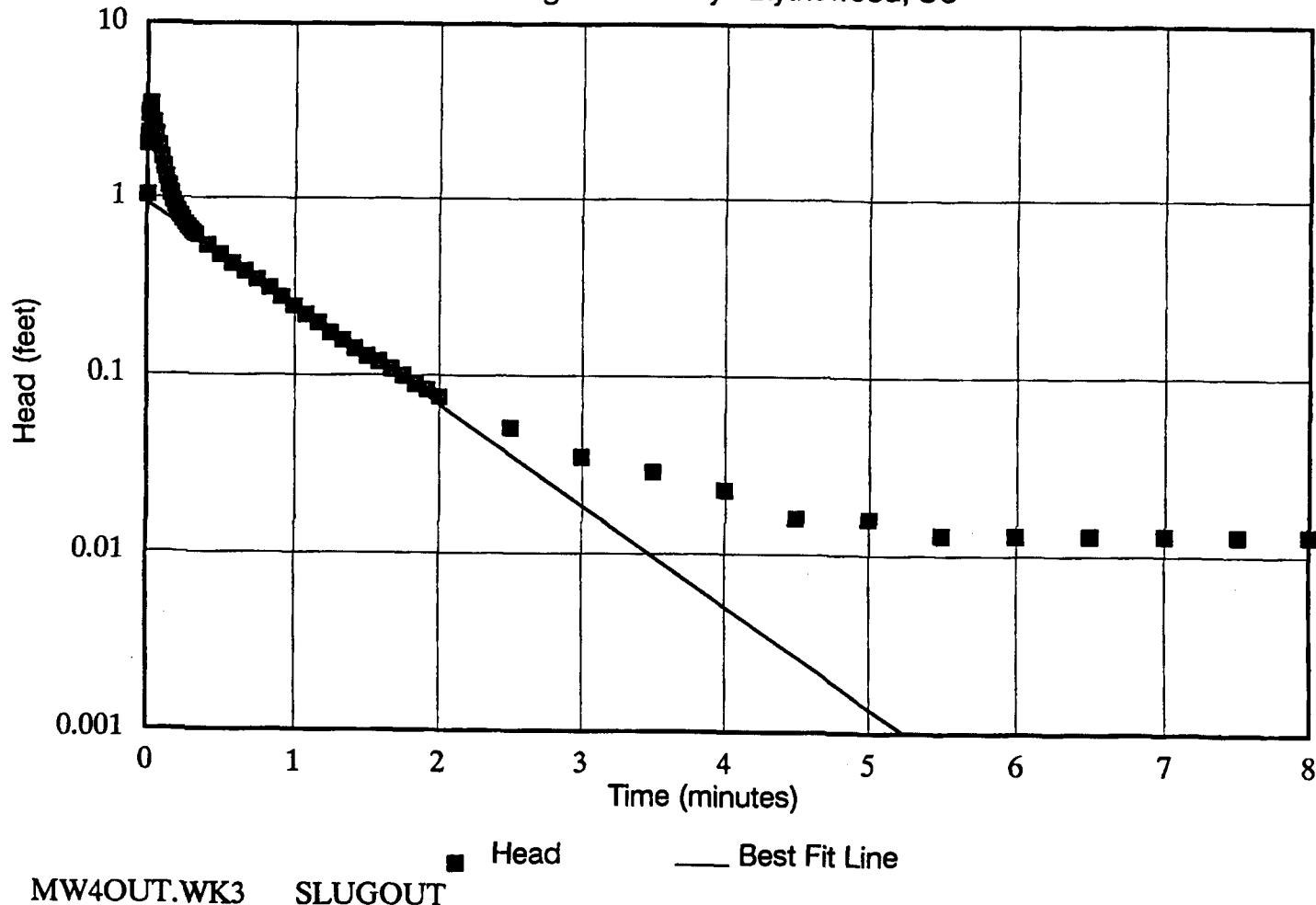
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Bouwer, H., 1989, DISCUSSION OF: The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory	
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head Log(y)	(Best Fit Line)	MW-4	Slug Out Page 2
0.0000	27.65	0.00	ERR	0.93		
0.0033	28.68	1.03	0.01284	0.93		
0.0067	29.65	2.00	0.30038	0.92		
0.0100	29.96	2.31	0.36286	0.92		
0.0133	30.61	2.96	0.47114	0.92		
0.0167	30.75	3.10	0.49066	0.91		
0.0200	29.92	2.27	0.35564	0.91		
0.0233	31.10	3.45	0.53782	0.90		
0.0267	30.74	3.09	0.48982	0.90		
0.0300	30.00	2.35	0.37181	0.90		
0.0467	30.35	2.70	0.43072	0.88		
0.0633	29.94	2.29	0.35984	0.86		
0.0800	29.62	1.97	0.29336	0.84		
0.0967	29.34	1.69	0.22686	0.82		
0.1133	29.13	1.48	0.16938	0.80		
0.1300	28.95	1.30	0.11261	0.79		
0.1467	28.81	1.16	0.06333	0.77		
0.1633	28.70	1.05	0.02202	0.75		
0.1800	28.61	0.96	-0.01773	0.74		
0.1967	28.54	0.89	-0.05012	0.72		
0.2133	28.48	0.83	-0.07883	0.71		
0.2300	28.43	0.78	-0.10624	0.69		
0.2467	28.40	0.75	-0.12784	0.68		
0.2633	28.36	0.71	-0.14874	0.66		
0.2800	28.33	0.68	-0.16622	0.65		
0.2967	28.31	0.66	-0.18310	0.63		
0.3133	28.28	0.63	-0.19791	0.62		
0.3300	28.27	0.62	-0.21112	0.61		
0.4133	28.18	0.53	-0.27327	0.54		
0.4967	28.12	0.47	-0.32514	0.49		
0.5800	28.07	0.42	-0.37469	0.44		
0.6633	28.03	0.38	-0.41908	0.39		
0.7467	27.99	0.34	-0.46471	0.35		
0.8300	27.96	0.31	-0.51145	0.32		
0.9133	27.92	0.27	-0.56384	0.28		
0.9967	27.89	0.24	-0.61798	0.25		
1.0800	27.87	0.22	-0.66555	0.23		
1.1633	27.84	0.19	-0.71220	0.20		
1.2467	27.82	0.17	-0.76700	0.18		
1.3300	27.81	0.16	-0.80688	0.16		
1.4133	27.79	0.14	-0.85387	0.15		
1.4967	27.78	0.13	-0.89620	0.13		
1.5800	27.77	0.12	-0.92812	0.12		
1.6633	27.76	0.11	-0.96658	0.11		
1.7467	27.75	0.10	-1.00436	0.10		
1.8300	27.74	0.09	-1.05061	0.09		
1.9133	27.73	0.08	-1.08092	0.08		
1.9967	27.73	0.08	-1.11919	0.07		
2.4967	27.70	0.05	-1.29243	0.04		
2.9967	27.69	0.04	-1.45593	0.02		
3.4967	27.68	0.03	-1.53760	0.01		
3.9967	27.67	0.02	-1.63827	0.01		
4.4967	27.67	0.02	-1.79588	0.00		
4.9967	27.67	0.02	-1.79588	0.00		
5.4967	27.66	0.01	-1.88606	0.00		
5.9967	27.66	0.01	-1.88606	0.00		
6.4967	27.66	0.01	-1.88606	0.00		
6.9967	27.66	0.01	-1.88606	0.00		
7.4967	27.66	0.01	-1.88606	0.00		
7.9967	27.66	0.01	-1.88606	0.00		
8.4967	27.66	0.01	-2.00000	0.00		
8.9967	27.66	0.01	-2.00000	0.00		
9.4967	27.66	0.01	-1.88606	0.00		
9.9967	27.66	0.01	-1.88606	0.00		

**MW-4 SLUG TEST ANALYSIS – SLUG OUT**  
Kings Laboratory Blythewood, SC



**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

**PROJECT DATA INPUT**

RJH 12/01/92  
Rev. 1.3

Site Name: Kings Laboratory  
Location: Blythewood, South Carolina  
Project No: 18-082.10

Data Collected By: L. Blakley Date: 10/22/92  
Data Analyzed By: R. Hunt Date: 12/01/92

**TEST WELL DATA INPUT**

Well No:	MW-5	Test Type:	1
Method:	HERMIT 1000 and 10 PSI Pressure Transducer		
Total Depth of Well From Measuring Point:	88.12 ft		
Static Depth To Water From Measuring Point:	26.92 ft	1 = Slug In	
Depth To Top Of Screen From Measuring Point:	73.12 ft	2 = Slug Out	
Length Of Screen:	15.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	50.00 ft (estimated)		
Porosity Of Sandpack:	0.40 as a decimal		

**CALCULATED TEST WELL PARAMETERS**

$L_e$ =	15.00 ft (effective screen length of well)		
$L_w$ =	50.00 ft (saturated thickness penetrated by well)		
$r_w$ =	0.333 ft (radius of borehole)		
$r_c$ =	0.083 ft (radius of casing)		
$r_c'$ =	0.083 ft (effective casing radius for partially saturated screens)		
$H$ =	50.00 ft (aquifer thickness)		
$L_e/R_w$ =	45.00 dimensionless		
$\ln(H-L_w)$ =	0.00 dimensionless	$\ln(R_e/r_w)$ =	3.51 dimensionless
( $r_w$ )		(if $L_w < H$ )	
$\ln(H-L_w)$ =	0.00 dimensionless	$\ln(R_e/r_w)$ =	3.60 dimensionless
(<or=6)		(if $L_w = H$ )	
$A$ =	2.94 dimensionless	$\ln(R_e/r_w)$ =	3.60 dimensionless
$B$ =	0.48 dimensionless	(final)	
$C$ =	2.61 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T1 = 0.1667 min (time that regression analysis starts)  
Time T2 = 15.8667 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:	
Constant	0.54432789
Std Err of Y Est	0.00445019
R Squared	0.99967309
No. of Observations	42
Degrees of Freedom	40
X Coefficient(s)	-0.05989883024936
Std Err of Coef.	0.000171265758064

**OUTPUT FROM BEST FIT LINE**

$Y_0$  = 3.5021 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)  
 $t$  = 15.8667 min (= time t, where  $t > 0$ , at which  $Y_t$  will be selected)  
 $Y_t$  = 0.3926 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

$K$ =	1.92E-06 ft/sec	$K$ =	5.85E-05 cm/sec
$K$ =	1.15E-04 ft/min	$K$ =	5.85E-07 m/sec
$K$ =	1.66E-01 ft/day	$K$ =	5.05E-02 m/day
$K$ =	1.24E+00 gpd/ft <sup>2</sup>	$T$ =	62 gpd/ft, or 8 ft <sup>2</sup> /day

**REFERENCES**

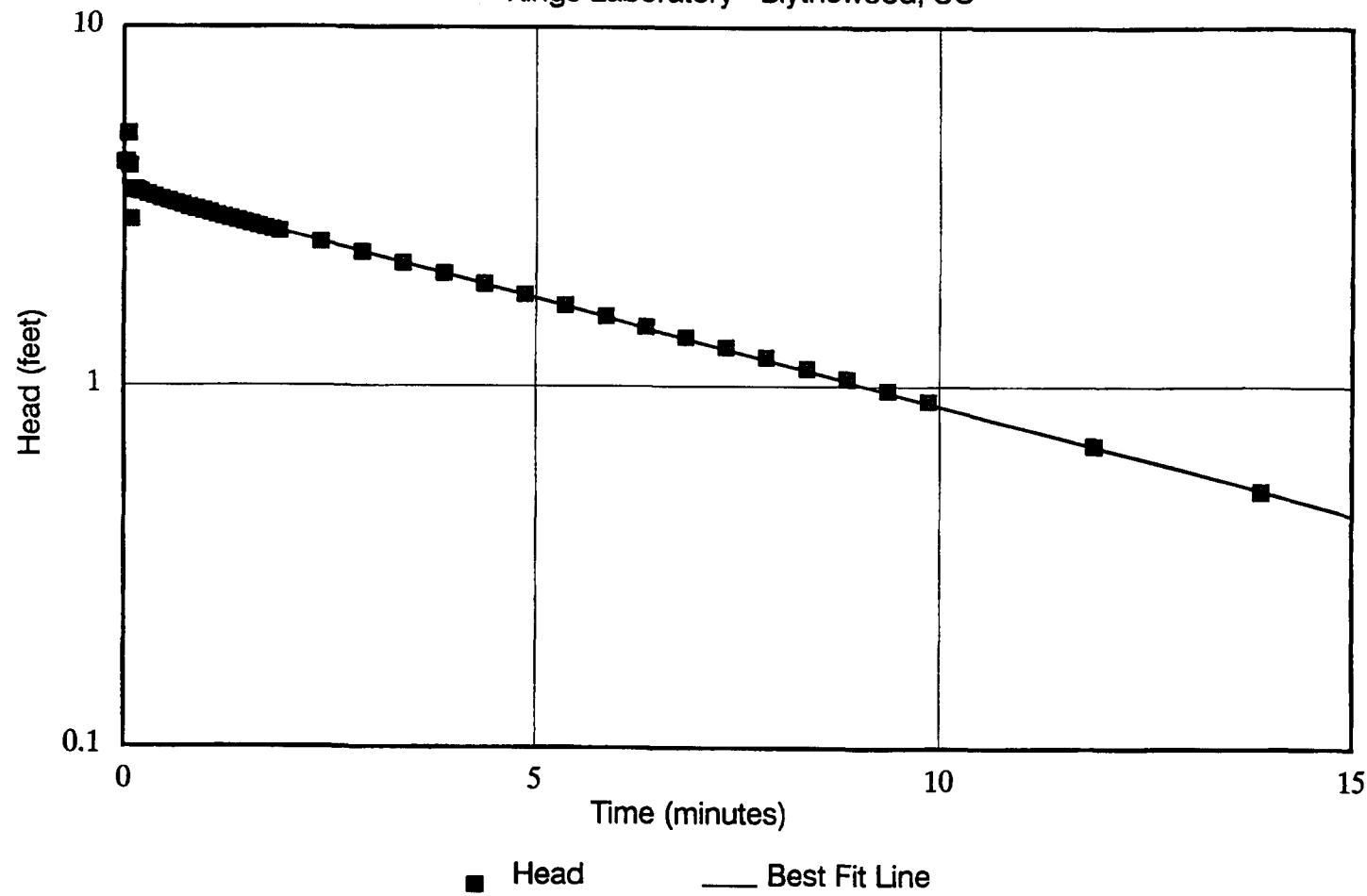
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Bouwer, H., 1989, DISCUSSION OF: The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory	
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head Log(y)	(Best Fit Line)	MW-5	Slug In Page 2
0.0000	26.92	0.00	ERR	3.50		
0.0167	22.74	4.18	0.62086	3.49		
0.0333	22.72	4.20	0.62346	3.49		
0.0500	21.91	5.01	0.69975	3.48		
0.0667	22.83	4.09	0.61183	3.47		
0.0833	24.02	2.90	0.46255	3.46		
0.1000	23.44	3.48	0.54133	3.45		
0.1167	23.40	3.52	0.54617	3.45		
0.1333	23.42	3.50	0.54456	3.44		
0.1500	23.43	3.49	0.54332	3.43		
0.1667	23.44	3.48	0.54183	3.42		
0.1833	23.45	3.47	0.54058	3.41		
0.2000	23.46	3.46	0.53895	3.41		
0.2833	23.52	3.40	0.53173	3.37		
0.3667	23.57	3.36	0.52569	3.33		
0.4500	23.62	3.30	0.51904	3.29		
0.5333	23.66	3.26	0.51308	3.25		
0.6167	23.71	3.22	0.50718	3.22		
0.7000	23.75	3.17	0.50161	3.18		
0.7833	23.79	3.13	0.49582	3.14		
0.8667	23.83	3.09	0.49010	3.11		
0.9500	23.87	3.05	0.48473	3.07		
1.0333	23.90	3.02	0.47972	3.04		
1.1167	23.94	2.98	0.47422	3.00		
1.2000	23.98	2.95	0.46909	2.97		
1.2833	24.01	2.91	0.46345	2.93		
1.3667	24.05	2.88	0.45864	2.90		
1.4500	24.08	2.84	0.45332	2.87		
1.5333	24.11	2.81	0.44840	2.83		
1.6167	24.14	2.78	0.44358	2.80		
1.7000	24.18	2.75	0.43854	2.77		
1.7833	24.21	2.71	0.43345	2.74		
1.8667	24.24	2.68	0.42846	2.71		
2.3667	24.41	2.51	0.39915	2.53		
2.8667	24.58	2.35	0.37014	2.36		
3.3667	24.73	2.19	0.34104	2.20		
3.8667	24.87	2.05	0.31239	2.05		
4.3667	25.00	1.92	0.28240	1.92		
4.8667	25.13	1.79	0.25358	1.79		
5.3667	25.25	1.68	0.22401	1.67		
5.8667	25.36	1.56	0.19424	1.56		
6.3667	25.45	1.47	0.16613	1.46		
6.8667	25.55	1.37	0.13672	1.36		
7.3667	25.64	1.28	0.10789	1.27		
7.8667	25.72	1.20	0.07882	1.18		
8.3667	25.80	1.12	0.04766	1.10		
8.8667	25.87	1.05	0.01995	1.03		
9.3667	25.95	0.97	-0.01144	0.96		
9.8667	26.01	0.91	-0.04239	0.90		
11.8667	26.24	0.69	-0.16431	0.68		
13.8667	26.41	0.51	-0.28988	0.52		
15.8667	26.54	0.38	-0.42022	0.39		

**MW-5 SLUG TEST ANALYSIS – SLUG IN**  
Kings Laboratory Blythewood, SC



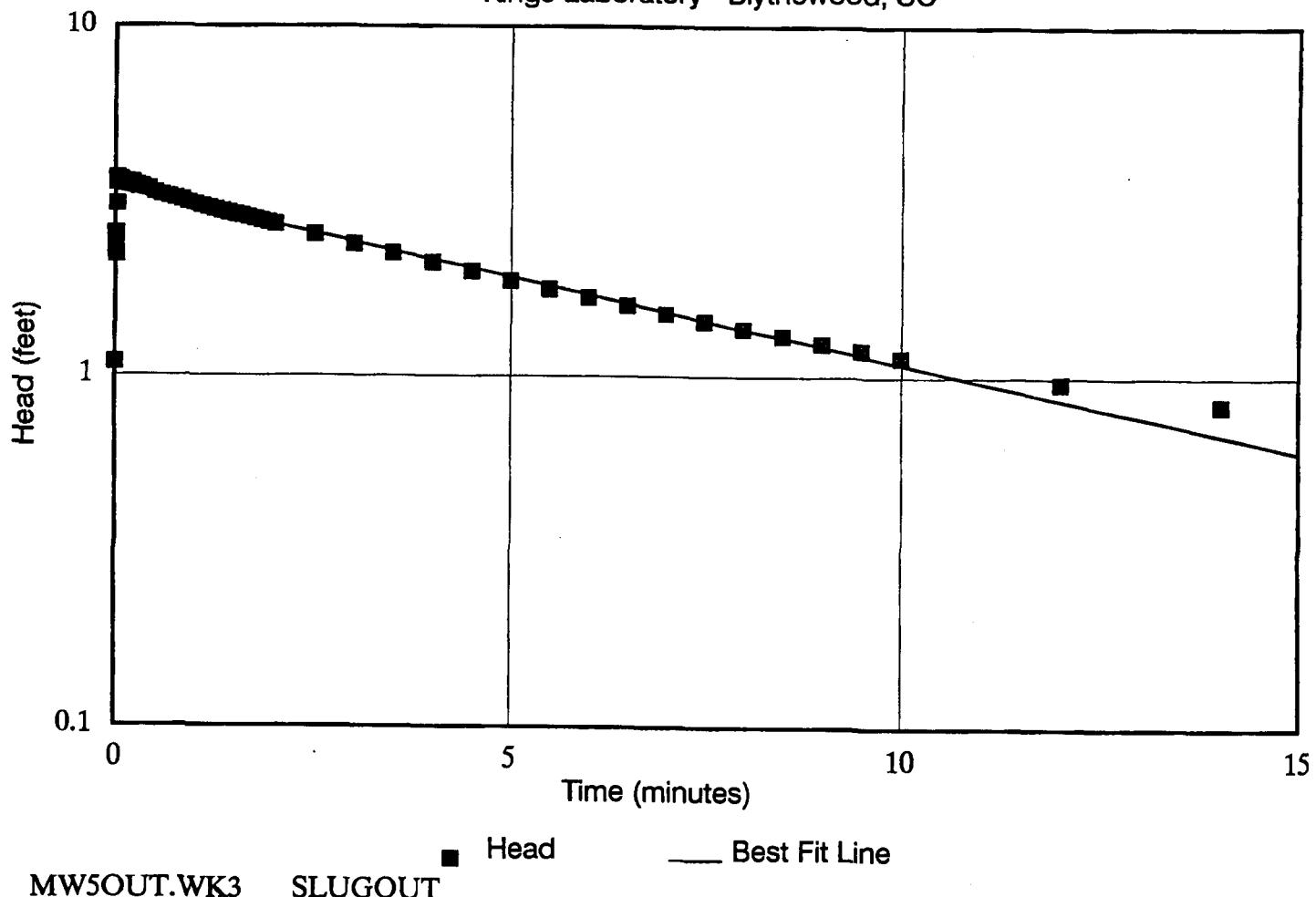
MW5IN.WK3      SLUGIN

**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

<b>PROJECT DATA INPUT</b>		RJH 12/01/92 Rev. 1.3	
Site Name: Kings Laboratory Location: Blythewood, South Carolina Project No: 18-082.10			
Data Collected By: L. Blakley Data Analyzed By: R. Hunt	Date: 10/22/92 Date: 12/01/92		
<b>TEST WELL DATA INPUT</b>			
Well No: MW-5	Test Type: 2		
Method: HERMIT 1000 and 10 PSI Pressure Transducer			
Total Depth of Well From Measuring Point:	88.12 ft	1 = Slug In 2 = Slug Out	
Static Depth To Water From Measuring Point:	26.92 ft		
Depth To Top Of Screen From Measuring Point:	73.12 ft		
Length Of Screen:	15.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	50.00 ft (estimated)		
Porosity Of Sandpack:	0.40 as a decimal		
<b>CALCULATED TEST WELL PARAMETERS</b>			
$L_e$ =	15.00 ft (effective screen length of well)		
$L_w$ =	50.00 ft (saturated thickness penetrated by well)		
$r_w$ =	0.333 ft (radius of borehole)		
$r_c$ =	0.083 ft (radius of casing)		
$r_{c'}$ =	0.083 ft (effective casing radius for partially saturated screens)		
$H$ =	50.00 ft (aquifer thickness)		
$L_e/R_w$ =	45.00 dimensionless		
$\ln(H-L_w)$ = (raw)	0.00 dimensionless	$\ln(R_e/r_w)$ = (if $L_w < H$ )	3.51 dimensionless
$\ln(H-L_w)$ = ( $< or = 6$ )	0.00 dimensionless	$\ln(R_e/r_w)$ = (if $L_w = H$ )	3.60 dimensionless
A=	2.94 dimensionless	$\ln(R_e/r_w)$ =	3.60 dimensionless
B=	0.48 dimensionless	(final)	
C=	2.61 dimensionless		
<b>REGRESSION ANALYSIS INPUT</b>			
Time T1 =	0.8267 min (time that regression analysis starts)		
Time T2 =	9.9934 min (time that regression analysis ends)		
<b>REGRESSION ANALYSIS OUTPUT</b>			
Regression Output:			
Constant	0.53086699		
Std Err of Y Est	0.00809136		
R Squared	0.99711594		
No. of Observations	31		
Degrees of Freedom	29		
X Coefficient(s)	-0.04950855725627		
Std Err of Coef.	0.000494436462427		
<b>OUTPUT FROM BEST FIT LINE</b>			
$Y_0$ =	3.3952 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)		
t =	9.9934 min (= time t, where t>0, at which Yt will be selected)		
$Y_t$ =	1.0867 ft (= head y @ time t, derived from best fit line of y/t plot)		
<b>CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY</b>			
K=	1.59E-06 ft/sec	K=	4.83E-05 cm/sec
K=	9.51E-05 ft/min	K=	4.83E-07 m/sec
K=	1.37E-01 ft/day	K=	4.17E-02 m/day
K=	1.02E+00 gpd/ft <sup>2</sup>	T=	51 gpd/ft, or 7 ft <sup>2</sup> /day
<b>REFERENCES</b>			
Bouwer, H. and Rice, R.C., 1976, A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells: Water Resources Research, v.12, pp. 423-428.			
Bouwer, H., 1989, The Bouwer and Rice slug test – an update: Ground Water, v.27, no.3, pp. 304-309.			
Bouwer, H., 1989, DISCUSSION OF: The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715			

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory	
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head Log(y)	(Best Fit Line)	MW-5	Slug Out Page 2
0.0000	26.92	0.00	ERR	3.40		
0.0034	28.01	1.09	0.03663	3.39		
0.0067	29.19	2.27	0.35507	3.39		
0.0100	29.45	2.53	0.40346	3.39		
0.0134	29.13	2.21	0.34341	3.39		
0.0167	29.44	2.52	0.40071	3.39		
0.0200	30.00	3.08	0.48827	3.39		
0.0234	30.48	3.56	0.55108	3.39		
0.0267	30.59	3.67	0.56443	3.38		
0.0434	30.55	3.63	0.55955	3.38		
0.0600	30.55	3.63	0.55991	3.37		
0.0767	30.52	3.60	0.55678	3.37		
0.0934	30.50	3.58	0.55413	3.36		
0.1100	30.49	3.57	0.55218	3.35		
0.1267	30.47	3.55	0.55072	3.35		
0.1434	30.49	3.57	0.55303	3.34		
0.1600	30.45	3.53	0.54716	3.33		
0.1767	30.46	3.54	0.54876	3.33		
0.1934	30.44	3.52	0.54679	3.32		
0.2100	30.48	3.56	0.55145	3.31		
0.2267	30.43	3.51	0.54481	3.31		
0.2434	30.41	3.49	0.54283	3.30		
0.2600	30.42	3.50	0.54407	3.30		
0.2767	30.39	3.47	0.54083	3.29		
0.2934	30.37	3.45	0.53769	3.28		
0.3100	30.39	3.47	0.54045	3.28		
0.3267	30.38	3.46	0.53933	3.27		
0.4100	30.33	3.41	0.53288	3.24		
0.4934	30.25	3.33	0.52270	3.21		
0.5767	30.20	3.28	0.51561	3.18		
0.6600	30.16	3.24	0.51001	3.15		
0.7434	30.12	3.20	0.50488	3.12		
0.8267	30.08	3.16	0.49969	3.09		
0.9100	30.04	3.12	0.49443	3.06		
0.9934	30.00	3.08	0.48911	3.03		
1.0767	29.97	3.05	0.48416	3.00		
1.1600	29.93	3.01	0.47914	2.97		
1.2434	29.90	2.98	0.47407	2.95		
1.3267	29.86	2.94	0.46894	2.92		
1.4100	29.83	2.91	0.46434	2.89		
1.4934	29.80	2.88	0.45954	2.86		
1.5767	29.77	2.85	0.45469	2.84		
1.6600	29.74	2.82	0.44994	2.81		
1.7434	29.71	2.79	0.44498	2.78		
1.8267	29.67	2.75	0.43996	2.76		
1.9100	29.65	2.73	0.43537	2.73		
1.9934	29.61	2.69	0.43040	2.71		
2.4934	29.45	2.53	0.40243	2.56		
2.9934	29.29	2.37	0.37475	2.41		
3.4934	29.15	2.23	0.34830	2.28		
3.9934	29.02	2.10	0.32222	2.15		
4.4934	28.90	1.98	0.29667	2.03		
4.9934	28.79	1.87	0.27161	1.92		
5.4934	28.69	1.77	0.24797	1.82		
5.9934	28.60	1.68	0.22401	1.71		
6.4934	28.51	1.59	0.20112	1.62		
6.9934	28.43	1.51	0.17811	1.53		
7.4934	28.35	1.43	0.15655	1.45		
7.9934	28.28	1.36	0.13481	1.36		
8.4934	28.22	1.30	0.11428	1.29		
8.9934	28.16	1.24	0.09342	1.22		
9.4934	28.11	1.19	0.07408	1.15		
9.9934	28.06	1.14	0.05500	1.09		
11.9934	27.88	0.96	-0.01728	0.87		
13.9934	27.75	0.83	-0.07883	0.69		
15.9934	27.66	0.74	-0.13136	0.55		
17.9934	27.60	0.68	-0.16877	0.44		

**MW-5 SLUG TEST ANALYSIS – SLUG OUT**  
Kings Laboratory Blythewood, SC



**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

**PROJECT DATA INPUT**

RJH 12/01/92  
Rev. 1.3

Site Name: Kings Laboratory  
Location: Blythewood, South Carolina  
Project No: 18-082.10

Data Collected By: L. Blakley Date: 10/22/92  
Data Analyzed By: R. Hunt Date: 12/02/92

**TEST WELL DATA INPUT**

Well No:	MW-6	Test Type:	1
Method: HERMIT 1000 and 10 PSI Pressure Transducer			
Total Depth of Well From Measuring Point:	39.92 ft	1 = Slug In	
Static Depth To Water From Measuring Point:	21.42 ft	2 = Slug Out	
Depth To Top Of Screen From Measuring Point:	34.92 ft		
Length Of Screen:	5.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	18.80 ft		
Porosity Of Sandpack:	0.40 as a decimal		

**CALCULATED TEST WELL PARAMETERS**

L <sub>e</sub> =	5.00 ft (effective screen length of well)		
L <sub>w</sub> =	18.50 ft (saturated thickness penetrated by well)		
r <sub>w</sub> =	0.333 ft (radius of borehole)		
r <sub>c</sub> =	0.083 ft (radius of casing)		
r <sub>c'</sub> =	0.083 ft (effective casing radius for partially saturated screens)		
H=	18.80 ft (aquifer thickness)		
L <sub>e</sub> /R <sub>w</sub> =	15.00 dimensionless		
In(H-L <sub>w</sub> )=	-0.11 dimensionless	In(R <sub>e</sub> /r <sub>w</sub> )=	2.46 dimensionless
(raw)		(if L <sub>w</sub> <H)	
In(H-L <sub>w</sub> )=	-0.11 dimensionless	In(R <sub>e</sub> /r <sub>w</sub> )=	2.70 dimensionless
(<or=6)		(if L <sub>w</sub> =H)	
A=	2.03 dimensionless	In(R <sub>e</sub> /r <sub>w</sub> )=	2.46 dimensionless
B=	0.32 dimensionless	(final)	
C=	1.44 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T<sub>1</sub> = 2.2834 min (time that regression analysis starts)  
Time T<sub>2</sub> = 13.7834 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:	
Constant	0.21994404
Std Err of Y Est	0.00892321
R Squared	0.99858196
No. of Observations	18
Degrees of Freedom	16
X Coefficient(s)	-0.07307576699162
Std Err of Coef.	0.000688440222825

**OUTPUT FROM BEST FIT LINE**

Y <sub>0</sub> =	1.6594 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)
t =	13.7834 min (= time t, where t>0, at which Y <sub>t</sub> will be selected)
Y <sub>t</sub> =	0.1632 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

K=	4.79E-06 ft/sec	K=	1.46E-04 cm/sec
K=	2.87E-04 ft/min	K=	1.46E-06 m/sec
K=	4.13E-01 ft/day	K=	1.26E-01 m/day
K=	3.09E+00 gpd/ft <sup>2</sup>	T=	58 gpd/ft, or 8 ft <sup>2</sup> /day

**REFERENCES**

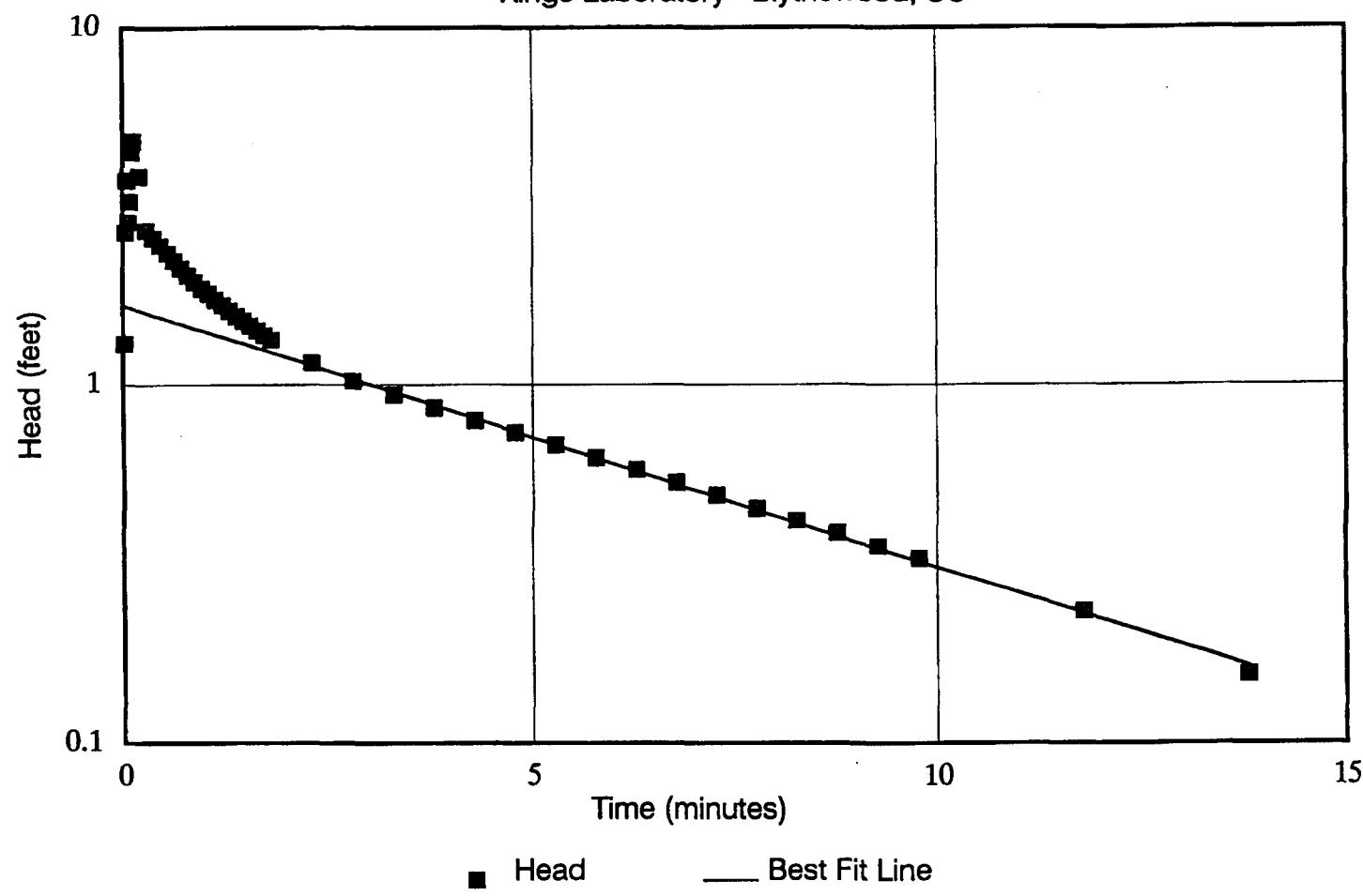
Bouwer, H. and Rice, R.C., 1976, A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells: Water Resources Research, v.12, pp. 423–428.

Bouwer, H., 1989, The Bouwer and Rice slug test – an update: Ground Water, v.27, no.3, pp. 304–309.

Bouwer, H., 1989, DISCUSSION OF The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory	
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head Log(y)	(Best Fit Line)	MW-6	Slug In Page 2
0.0000	21.42	0.00	.ERR	1.66		
0.0167	20.13	1.29	0.11193	1.65		
0.0334	18.76	2.67	0.42570	1.65		
0.0500	17.67	3.75	0.57380	1.65		
0.0667	18.57	2.85	0.45469	1.64		
0.0834	18.16	3.27	0.51388	1.64		
0.1000	16.92	4.50	0.65350	1.63		
0.1167	16.61	4.82	0.68260	1.63		
0.2000	17.57	3.85	0.58535	1.60		
0.2834	18.73	2.69	0.43040	1.58		
0.3667	18.86	2.56	0.40892	1.56		
0.4500	18.98	2.44	0.38739	1.54		
0.5334	19.10	2.32	0.36586	1.52		
0.6167	19.22	2.21	0.34341	1.50		
0.7000	19.32	2.10	0.32222	1.47		
0.7834	19.42	2.01	0.30211	1.45		
0.8667	19.50	1.92	0.28375	1.43		
0.9500	19.57	1.85	0.26623	1.41		
1.0334	19.64	1.78	0.25042	1.39		
1.1167	19.71	1.71	0.23376	1.38		
1.2000	19.76	1.66	0.21906	1.36		
1.2834	19.82	1.60	0.20466	1.34		
1.3667	19.87	1.55	0.18977	1.32		
1.4500	19.92	1.50	0.17609	1.30		
1.5334	19.96	1.46	0.16316	1.28		
1.6167	20.01	1.41	0.14953	1.26		
1.7000	20.05	1.37	0.13672	1.25		
1.7834	20.09	1.33	0.12352	1.23		
2.2834	20.27	1.15	0.05994	1.13		
2.7834	20.40	1.02	0.01030	1.04		
3.2834	20.49	0.94	-0.02919	0.96		
3.7834	20.56	0.86	-0.06449	0.88		
4.2834	20.63	0.80	-0.09963	0.81		
4.7834	20.69	0.74	-0.13371	0.74		
5.2834	20.74	0.68	-0.16685	0.68		
5.7834	20.79	0.63	-0.20273	0.63		
6.2834	20.84	0.58	-0.23657	0.58		
6.7834	20.89	0.54	-0.27165	0.53		
7.2834	20.93	0.49	-0.30627	0.49		
7.7834	20.97	0.45	-0.34390	0.45		
8.2834	21.00	0.42	-0.37882	0.41		
8.7834	21.03	0.39	-0.41341	0.38		
9.2834	21.07	0.35	-0.45100	0.35		
9.7834	21.09	0.33	-0.48678	0.32		
11.7834	21.19	0.23	-0.63639	0.23		
13.7834	21.27	0.15	-0.81248	0.16		

**MW-6 SLUG TEST ANALYSIS – SLUG IN**  
Kings Laboratory Blythewood, SC



MW6IN.WK3      SLUGIN

**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

**PROJECT DATA INPUT**

Site Name: Kings Laboratory  
 Location: Blythewood, South Carolina  
 Project No: 18-082.10

RJH 12/01/92  
 Rev. 1.3

Data Collected By: L. Blakley Date: 10/22/92  
 Data Analyzed By: R. Hunt Date: 12/01/92

**TEST WELL DATA INPUT**

Well No: MW-6 Test Type: 2

Method: HERMIT 1000 and 10 PSI Pressure Transducer

Total Depth of Well From Measuring Point:	39.92 ft	1 = Slug In
Static Depth To Water From Measuring Point:	21.42 ft	2 = Slug Out
Depth To Top Of Screen From Measuring Point:	34.92 ft	
Length Of Screen:	5.00 ft	
Radius Of Hole:	0.333 ft	
Radius Of Casing:	0.083 ft	
Aquifer Thickness:	18.80 ft	
Porosity Of Sandpack:	0.40 as a decimal	

**CALCULATED TEST WELL PARAMETERS**

Le=	5.00 ft (effective screen length of well)		
Lw=	18.50 ft (saturated thickness penetrated by well)		
rw=	0.333 ft (radius of borehole)		
rc=	0.083 ft (radius of casing)		
rc'=	0.083 ft (effective casing radius for partially saturated screens)		
H=	18.80 ft (aquifer thickness)		
Le/Rw=	15.00 dimensionless		
In(H-Lw)= (raw)	-0.11 dimensionless	In(Re/rw)= (if Lw < H)	2.46 dimensionless
In(H-Lw)= (<or=6)	-0.11 dimensionless	In(Re/rw)= (if Lw = H)	2.70 dimensionless
A=	2.03 dimensionless	In(Re/rw)=	2.46 dimensionless
B=	0.32 dimensionless	(final)	
C=	1.44 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T1 = 0.9667 min (time that regression analysis starts)  
 Time T2 = 19.9667 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:

Constant	0.49006257
Std Err of Y Est	0.00629115
R Squared	0.9981828
No. of Observations	34
Degrees of Freedom	32

X Coefficient(s) -0.02795973971662  
 Std Err of Coef. 0.000210888991974

**OUTPUT FROM BEST FIT LINE**

Yo = 3.0907 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)  
 t= 19.9667 min (= time t, where t>0, at which Yt will be selected)  
 Yt= 0.8547 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

K= 1.83E-06 ft/sec	K= 5.58E-05 cm/sec
K= 1.10E-04 ft/min	K= 5.58E-07 m/sec
K= 1.58E-01 ft/day	K= 4.82E-02 m/day
K= 1.18E+00 gpd/ft <sup>2</sup>	T= 22 gpd/ft, or 3 ft <sup>2</sup> /day

**REFERENCES**

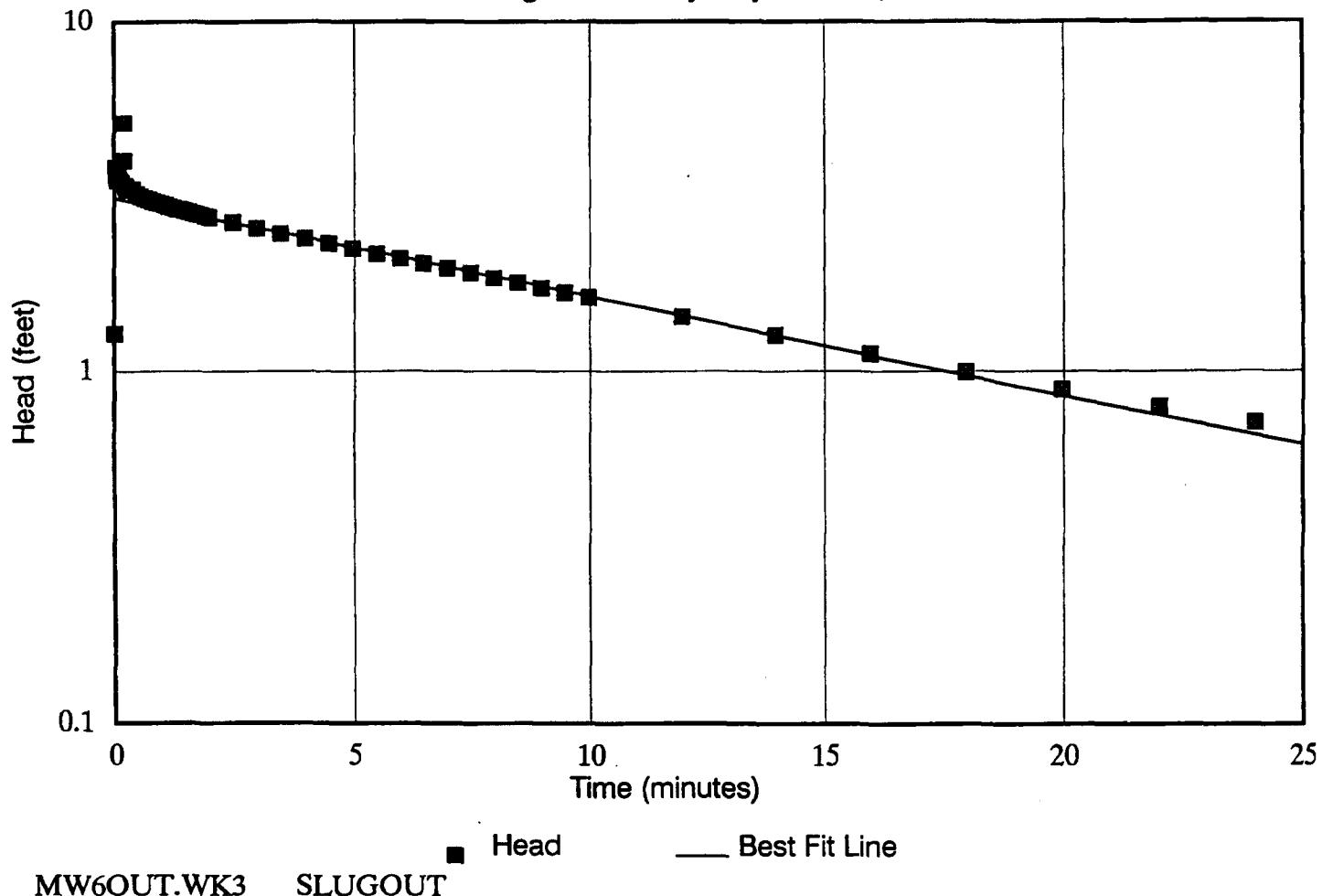
Bouwer, H. and Rice, R.C., 1976, A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells: Water Resources Research, v.12, pp. 423-428.

Bouwer, H., 1989, The Bouwer and Rice slug test – an update: Ground Water, v.27, no.3, pp. 304-309.

Bouwer, H., 1989, DISCUSSION OF The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head (Best Fit Line)	MW-6	Slug Out Page 2
0.0000	21.42	0.00	ERR	3.09	
0.0167	22.69	1.27	0.10312	3.09	
0.0333	25.19	3.77	0.57623	3.08	
0.0500	24.99	3.57	0.55291	3.08	
0.0667	24.89	3.47	0.53995	3.08	
0.0833	24.98	3.56	0.55133	3.07	
0.1000	24.92	3.50	0.54394	3.07	
0.1167	24.89	3.47	0.54083	3.07	
0.1333	24.86	3.44	0.53605	3.06	
0.1500	24.83	3.41	0.53314	3.06	
0.1667	24.81	3.39	0.52994	3.06	
0.1833	25.36	3.94	0.59583	3.05	
0.2000	26.53	5.11	0.70825	3.05	
0.2167	25.37	3.95	0.59616	3.05	
0.2333	24.76	3.34	0.52336	3.04	
0.2500	24.72	3.30	0.51799	3.04	
0.2667	24.70	3.28	0.51548	3.04	
0.2833	24.68	3.26	0.51335	3.03	
0.3000	24.68	3.26	0.51255	3.03	
0.3833	24.68	3.26	0.51375	3.02	
0.4667	24.58	3.16	0.50010	3.00	
0.5500	24.54	3.12	0.49388	2.98	
0.6333	24.50	3.08	0.48897	2.97	
0.7167	24.48	3.06	0.48544	2.95	
0.8000	24.44	3.02	0.48044	2.94	
0.8833	24.42	3.00	0.47683	2.92	
0.9667	24.39	2.97	0.47305	2.90	
1.0500	24.37	2.95	0.46982	2.89	
1.1333	24.35	2.93	0.46613	2.87	
1.2167	24.32	2.90	0.46270	2.86	
1.3000	24.30	2.88	0.45939	2.84	
1.3833	24.28	2.86	0.45652	2.83	
1.4667	24.26	2.84	0.45317	2.81	
1.5500	24.24	2.82	0.45025	2.80	
1.6333	24.22	2.80	0.44731	2.78	
1.7167	24.20	2.78	0.44436	2.77	
1.8000	24.18	2.76	0.44138	2.75	
1.8833	24.17	2.75	0.43886	2.74	
1.9667	24.15	2.73	0.43584	2.72	
2.4667	24.05	2.63	0.41996	2.64	
2.9667	23.96	2.54	0.40449	2.55	
3.4667	23.87	2.45	0.38899	2.47	
3.9667	23.79	2.37	0.37457	2.39	
4.4667	23.71	2.29	0.35984	2.32	
4.9667	23.63	2.21	0.34518	2.24	
5.4667	23.56	2.14	0.33122	2.17	
5.9667	23.49	2.07	0.31681	2.10	
6.4667	23.43	2.01	0.30276	2.04	
6.9667	23.36	1.94	0.28870	1.97	
7.4667	23.30	1.88	0.27508	1.91	
7.9667	23.24	1.82	0.26102	1.85	
8.4667	23.19	1.77	0.24699	1.79	
8.9667	23.13	1.71	0.23274	1.74	
9.4667	23.08	1.66	0.21985	1.68	
9.9667	23.03	1.61	0.20629	1.63	
11.9667	22.83	1.41	0.15045	1.43	
13.9667	22.68	1.26	0.10003	1.26	
15.9667	22.54	1.12	0.04766	1.11	
17.9667	22.41	0.99	-0.00349	0.97	
19.9667	22.31	0.89	-0.05208	0.85	
21.9667	22.22	0.80	-0.09963	0.75	
23.9667	22.14	0.72	-0.14509	0.66	
25.9667	22.07	0.65	-0.18977	0.58	
27.9667	22.01	0.59	-0.22768	0.51	

**MW-6 SLUG TEST ANALYSIS – SLUG OUT**  
Kings Laboratory Blythewood, SC



**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

**PROJECT DATA INPUT**

RJH 12/01/92  
Rev. 1.3

Site Name: Kings Laboratory  
Location: Blythewood, South Carolina  
Project No: 18-082.10

Data Collected By: L. Blakley Date: 10/22/92  
Data Analyzed By: R. Hunt Date: 12/02/92

**TEST WELL DATA INPUT**

Well No:	MW-7	Test Type:	1
Method: HERMIT 1000 and 10 PSI Pressure Transducer			
Total Depth Of Well From Measuring Point:	36.38 ft	1 = Slug In	
Static Depth To Water From Measuring Point:	23.64 ft	2 = Slug Out	
Depth To Top Of Screen From Measuring Point:	31.38 ft		
Length Of Screen:	5.00 ft		
Radius Of Hole:	0.333 ft		
Radius Of Casing:	0.083 ft		
Aquifer Thickness:	13.85 ft		
Porosity Of Sandpack:	0.40 as a decimal		

**CALCULATED TEST WELL PARAMETERS**

L <sub>e</sub> =	5.00 ft (effective screen length of well)		
L <sub>w</sub> =	12.74 ft (saturated thickness penetrated by well)		
r <sub>w</sub> =	0.333 ft (radius of borehole)		
r <sub>c</sub> =	0.083 ft (radius of casing)		
r <sub>c'</sub> =	0.083 ft (effective casing radius for partially saturated screens)		
H=	13.85 ft (aquifer thickness)		
L <sub>e</sub> /R <sub>w</sub> =	15.00 dimensionless		
ln(H-L <sub>w</sub> )=(raw)	1.20 dimensionless	ln(R <sub>e</sub> /r <sub>w</sub> )=(if L <sub>w</sub> <H)	2.16 dimensionless
ln(H-L <sub>w</sub> )(<or=6)	1.20 dimensionless	ln(R <sub>e</sub> /r <sub>w</sub> )=(if L <sub>w</sub> =H)	2.51 dimensionless
A=	2.03 dimensionless	ln(R <sub>e</sub> /r <sub>w</sub> )=(final)	2.16 dimensionless
B=	0.32 dimensionless		
C=	1.44 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T<sub>1</sub> = 0.5333 min (time that regression analysis starts)  
Time T<sub>2</sub> = 1.8667 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:	
Constant	0.28312602
Std Err of Y Est	0.01850266
R Squared	0.99826203
No. of Observations	17
Degrees of Freedom	15
X Coefficient(s)	-1.0203054586425
Std Err of Coef.	0.010992155406947

**OUTPUT FROM BEST FIT LINE**

Y<sub>0</sub> = 1.9192 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)  
t = 1.8667 min (= time t, where t>0, at which Y<sub>t</sub> will be selected)  
Y<sub>t</sub> = 0.0239 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

K= 5.88E-05 ft/sec	K= 1.79E-03 cm/sec
K= 3.53E-03 ft/min	K= 1.79E-05 m/sec
K= 5.08E+00 ft/day	K= 1.55E+00 m/day
K= 3.80E+01 gpd/ft <sup>2</sup>	T= 526 gpd/ft, or 70 ft <sup>2</sup> /day

**REFERENCES**

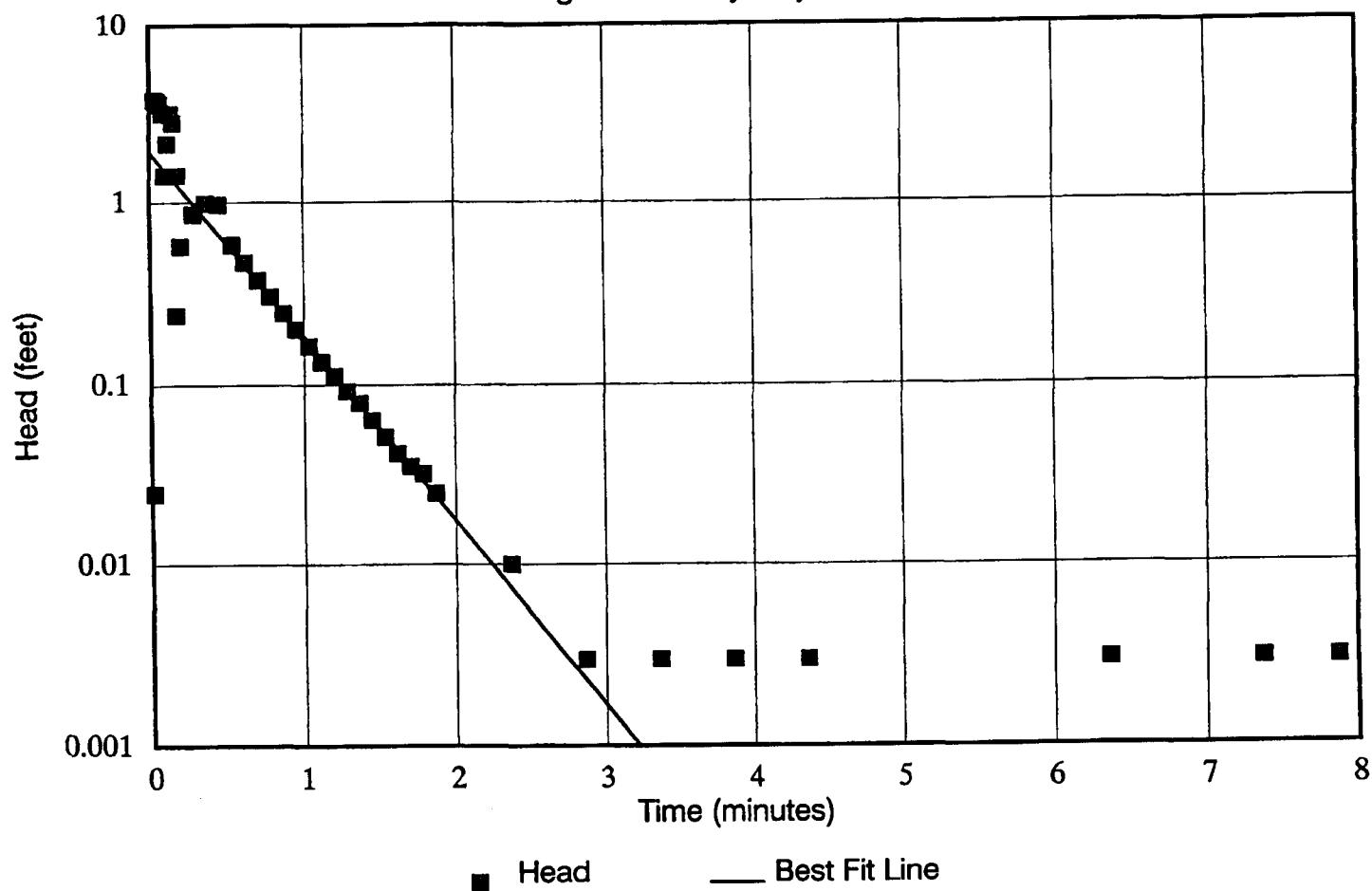
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Bouwer, H., 1989, DISCUSSION OF The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory	
Time (min.)	Depth below MP(ft)	Head (ft)	Head Log(y)	(Best Fit Line)	MW-7	Slug In Page 2
0.0000	23.64	0.00	ERR	1.92		
0.0167	23.62	0.03	-1.60206	1.85		
0.0333	19.91	3.73	0.57136	1.77		
0.0500	20.00	3.65	0.56170	1.71		
0.0667	20.13	3.51	0.54506	1.64		
0.0833	20.51	3.13	0.49527	1.58		
0.1000	22.23	1.41	0.14860	1.52		
0.1167	21.50	2.14	0.33122	1.46		
0.1333	20.52	3.12	0.49388	1.40		
0.1500	20.86	2.78	0.44389	1.35		
0.1667	23.40	0.24	-0.61798	1.30		
0.1833	22.22	1.42	0.15168	1.25		
0.2000	23.06	0.58	-0.23958	1.20		
0.2833	22.78	0.86	-0.06550	0.99		
0.3667	22.65	0.99	-0.00436	0.81		
0.4500	22.67	0.97	-0.01278	0.67		
0.5333	23.06	0.58	-0.23359	0.55		
0.6167	23.17	0.47	-0.32883	0.45		
0.7000	23.26	0.38	-0.42366	0.37		
0.7833	23.34	0.31	-0.51570	0.30		
0.8667	23.39	0.25	-0.60730	0.25		
0.9500	23.44	0.20	-0.69897	0.21		
1.0333	23.48	0.16	-0.79048	0.17		
1.1167	23.51	0.13	-0.87615	0.14		
1.2000	23.53	0.11	-0.95468	0.11		
1.2833	23.55	0.09	-1.03621	0.09		
1.3667	23.56	0.08	-1.10237	0.08		
1.4500	23.58	0.06	-1.20066	0.06		
1.5333	23.59	0.05	-1.29243	0.05		
1.6167	23.60	0.04	-1.38722	0.04		
1.7000	23.61	0.04	-1.45593	0.04		
1.7833	23.61	0.03	-1.49485	0.03		
1.8667	23.62	0.03	-1.60206	0.02		
2.3667	23.63	0.01	-2.00000	0.01		
2.8667	23.64	0.00	-2.52288	0.00		
3.3667	23.64	0.00	-2.52288	0.00		
3.8667	23.64	0.00	-2.52288	0.00		
4.3667	23.64	0.00	-2.52288	0.00		
4.8667	23.64	0.00	ERR	0.00		
5.3667	23.64	0.00	ERR	0.00		
5.8667	23.64	0.00	ERR	0.00		
6.3667	23.64	0.00	-2.52288	0.00		
6.8667	23.64	0.00	ERR	0.00		
7.3667	23.64	0.00	-2.52288	0.00		
7.8667	23.64	0.00	-2.52288	0.00		
8.3667	23.64	0.00	ERR	0.00		
8.8667	23.64	0.00	ERR	0.00		
9.3667	23.64	0.00	ERR	0.00		
9.8667	23.64	0.00	ERR	0.00		

**MW-7 SLUG TEST ANALYSIS – SLUG IN**  
Kings Laboratory Blythewood, SC



MW7IN.WK3      SLUGIN

**POST, BUCKLEY, SCHUH & JERNIGAN, INC.**  
**SLUG TEST DATA ANALYSIS – BOUWER AND RICE METHOD**  
**For an Unconfined Aquifer with a Partially or Fully Penetrating Well**

**PROJECT DATA INPUT**

RJH 12/01/92  
Rev. 1.3

Site Name: Kings Laboratory  
Location: Blythewood, South Carolina  
Project No: 18-082.10

Data Collected By: L. Blakley Date: 10/22/92  
Data Analyzed By: R. Hunt Date: 12/02/92

**TEST WELL DATA INPUT**

Well No: MW-7 Test Type: 2

Method: HERMIT 1000 and 10 PSI Pressure Transducer

Total Depth of Well From Measuring Point:	36.38 ft	1 = Slug In
Static Depth To Water From Measuring Point:	23.64 ft	2 = Slug Out
Depth To Top Of Screen From Measuring Point:	31.38 ft	
Length Of Screen:	5.00 ft	
Radius Of Hole:	0.333 ft	
Radius Of Casing:	0.083 ft	
Aquifer Thickness:	13.85 ft	
Porosity Of Sandpack:	0.40 as a decimal	

**CALCULATED TEST WELL PARAMETERS**

Le=	5.00 ft (effective screen length of well)
Lw=	12.74 ft (saturated thickness penetrated by well)
rw=	0.333 ft (radius of borehole)
rc=	0.083 ft (radius of casing)
rc'=	0.083 ft (effective casing radius for partially saturated screens)
H=	13.85 ft (aquifer thickness)
Le/Rw=	15.00 dimensionless

ln(H-Lw)= (raw)	1.20 dimensionless	ln(Re/rw)= (if Lw < H)	2.16 dimensionless
ln(H-Lw)= (<or=6)	1.20 dimensionless	ln(Re/rw)= (if Lw = H)	2.51 dimensionless
A=	2.03 dimensionless	ln(Re/rw)=	2.16 dimensionless
B=	0.32 dimensionless	(final)	
C=	1.44 dimensionless		

**REGRESSION ANALYSIS INPUT**

Time T1 = 0.1333 min (time that regression analysis starts)  
Time T2 = 0.6666 min (time that regression analysis ends)

**REGRESSION ANALYSIS OUTPUT**

Regression Output:

Constant	0.55668465
Std Err of Y Est	0.00608825
R Squared	0.99903021
No. of Observations	17
Degrees of Freedom	15

X Coefficient(s)	-1.23413728017384
Std Err of Coef.	0.0099281154644

**OUTPUT FROM BEST FIT LINE**

Yo =	3.6032 ft (= head y @ t=0, derived from y intercept of best fit line on y/t plot)
t =	0.6666 min (= time t, where t>0, at which Yt will be selected)
Yt =	0.5420 ft (= head y @ time t, derived from best fit line of y/t plot)

**CALCULATED HYDRAULIC CONDUCTIVITY AND TRANSMISSIVITY**

K=	7.11E-05 ft/sec	K=	2.17E-03 cm/sec
K=	4.26E-03 ft/min	K=	2.17E-05 m/sec
K=	6.14E+00 ft/day	K=	1.87E+00 m/day
K=	4.59E+01 gpd/ft^2	T=	636 gpd/ft, or 85 ft^2/day

**REFERENCES**

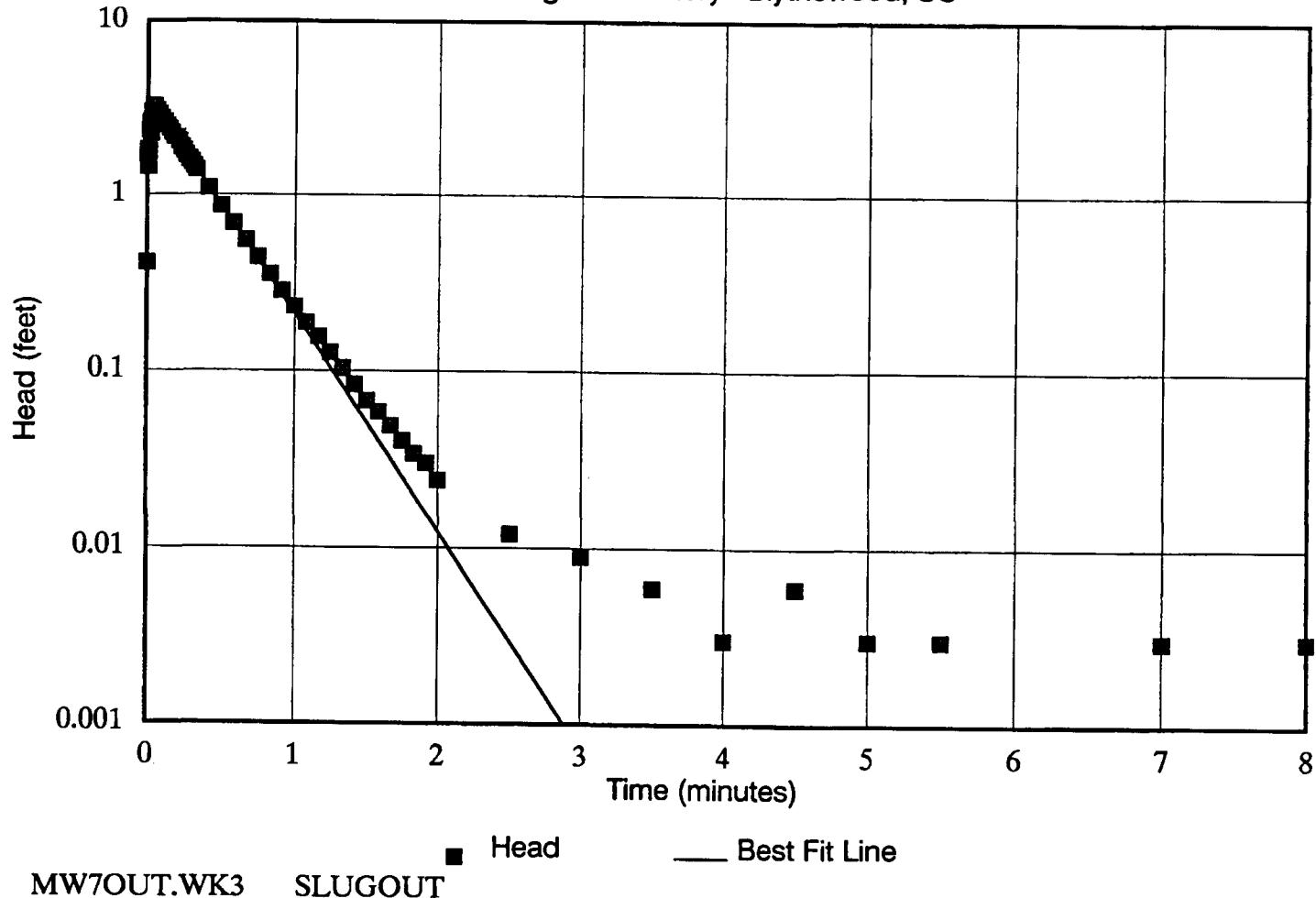
Bouwer, H. and Rice, R.C., 1976, A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells: Water Resources Research, v.12, pp. 423-428.

Bouwer, H., 1989, The Bouwer and Rice slug test – an update: Ground Water, v.27, no.3, pp. 304-309.

Bouwer, H., 1989, DISCUSSION OF The Bouwer and Rice slug test – an update: Ground Water, v.27, no.5, p.715

SLUG TEST DATA INPUT, HEAD, AND BEST FIT LINE FROM REGRESSION ANALYSIS					Kings Laboratory MW-7	Slug Out Page 2
Time (min.)	Depth be- low MP(ft)	Head (ft)	Head Log(y)	(Best Fit Line)		
0.0000	24.05	0.41	-0.38934	3.60		
0.0033	25.32	1.68	0.22427	3.57		
0.0066	25.43	1.79	0.25382	3.54		
0.0100	25.07	1.43	0.15503	3.50		
0.0133	25.39	1.75	0.24279	3.47		
0.0166	25.96	2.32	0.36493	3.44		
0.0200	26.19	2.55	0.40569	3.40		
0.0233	25.85	2.21	0.34479	3.37		
0.0266	26.26	2.62	0.41847	3.34		
0.0300	26.21	2.57	0.40943	3.31		
0.0333	26.65	3.01	0.47784	3.28		
0.0500	26.86	3.22	0.50745	3.13		
0.0666	26.67	3.03	0.48101	2.98		
0.0833	26.52	2.88	0.45909	2.84		
0.1000	26.37	2.73	0.43600	2.71		
0.1166	26.24	2.60	0.41531	2.59		
0.1333	26.11	2.47	0.39199	2.47		
0.1500	26.00	2.36	0.37254	2.35		
0.1666	25.88	2.24	0.35102	2.24		
0.1833	25.77	2.13	0.32838	2.14		
0.2000	25.76	2.12	0.32572	2.04		
0.2166	25.63	1.99	0.29951	1.95		
0.2333	25.49	1.85	0.26741	1.86		
0.2500	25.40	1.76	0.24527	1.77		
0.2666	25.32	1.68	0.22427	1.69		
0.2833	25.23	1.59	0.20167	1.61		
0.3000	25.16	1.52	0.18298	1.54		
0.3166	25.09	1.45	0.16077	1.47		
0.3333	25.02	1.38	0.14019	1.40		
0.4166	24.73	1.09	0.03862	1.10		
0.5000	24.50	0.86	-0.06349	0.87		
0.5833	24.33	0.69	-0.16115	0.69		
0.6666	24.19	0.55	-0.25885	0.54		
0.7500	24.08	0.44	-0.35655	0.43		
0.8333	23.99	0.35	-0.45100	0.34		
0.9166	23.92	0.28	-0.54668	0.27		
1.0000	23.87	0.23	-0.63827	0.21		
1.0833	23.83	0.19	-0.73049	0.17		
1.1666	23.79	0.15	-0.81248	0.13		
1.2500	23.77	0.13	-0.89963	0.10		
1.3333	23.74	0.10	-0.98716	0.08		
1.4166	23.72	0.08	-1.07572	0.06		
1.5000	23.71	0.07	-1.16749	0.05		
1.5833	23.70	0.06	-1.22915	0.04		
1.6666	23.69	0.05	-1.30980	0.03		
1.7500	23.68	0.04	-1.39794	0.02		
1.8333	23.67	0.03	-1.46852	0.02		
1.9166	23.67	0.03	-1.52288	0.02		
2.0000	23.66	0.02	-1.61979	0.01		
2.5000	23.65	0.01	-1.92082	0.00		
3.0000	23.65	0.01	-2.04576	0.00		
3.5000	23.65	0.01	-2.22185	0.00		
4.0000	23.64	0.00	-2.52288	0.00		
4.5000	23.65	0.01	-2.22185	0.00		
5.0000	23.64	0.00	-2.52288	0.00		
5.5000	23.64	0.00	-2.52288	0.00		
6.0000	23.64	0.00	ERR	0.00		
6.5000	23.64	0.00	ERR	0.00		
7.0000	23.64	0.00	-2.52288	0.00		
7.5000	23.64	0.00	ERR	0.00		
8.0000	23.64	0.00	-2.52288	0.00		
8.5000	23.64	0.00	-2.52288	0.00		
9.0000	23.64	0.00	-2.52288	0.00		
9.5000	23.64	0.00	-2.52288	0.00		
10.0000	23.64	0.00	-2.52288	0.00		

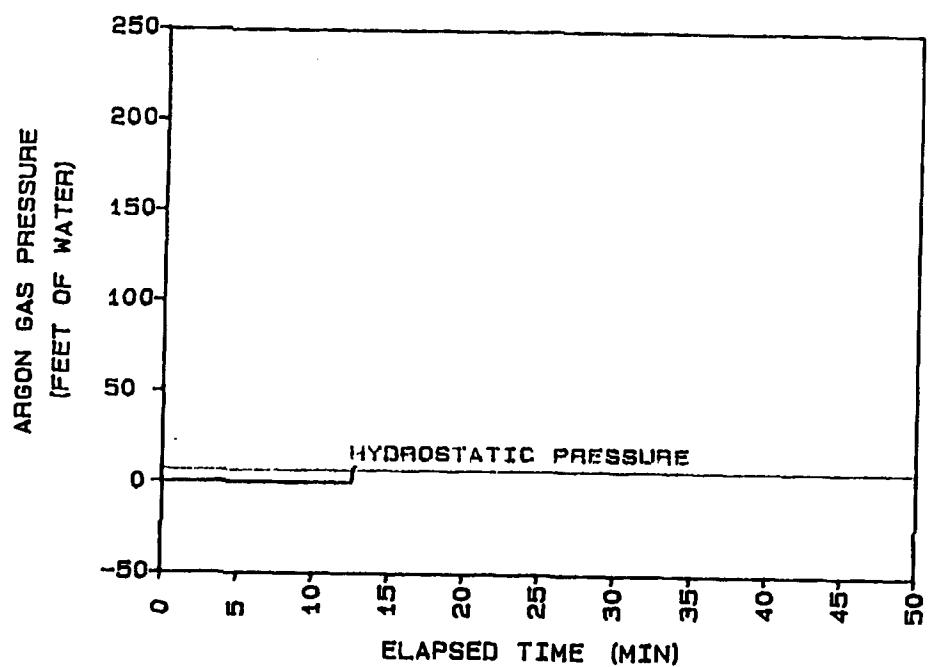
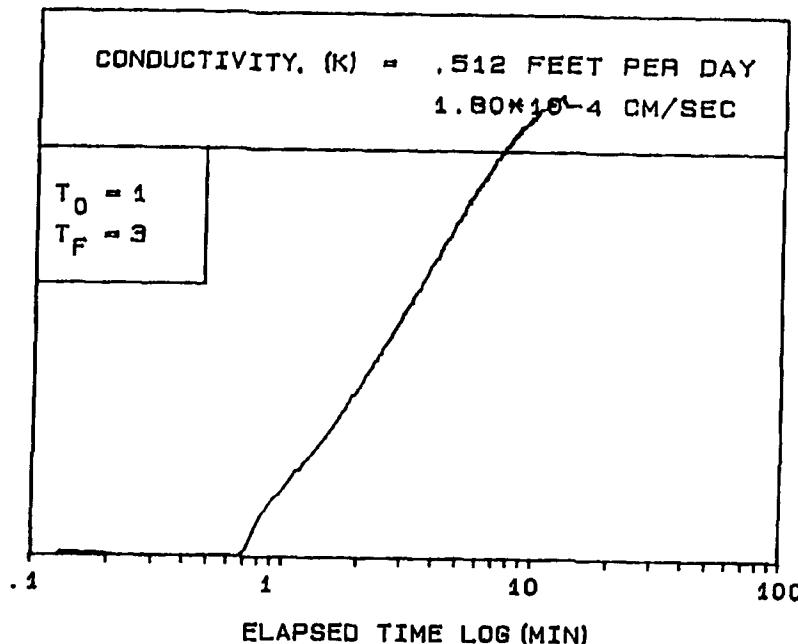
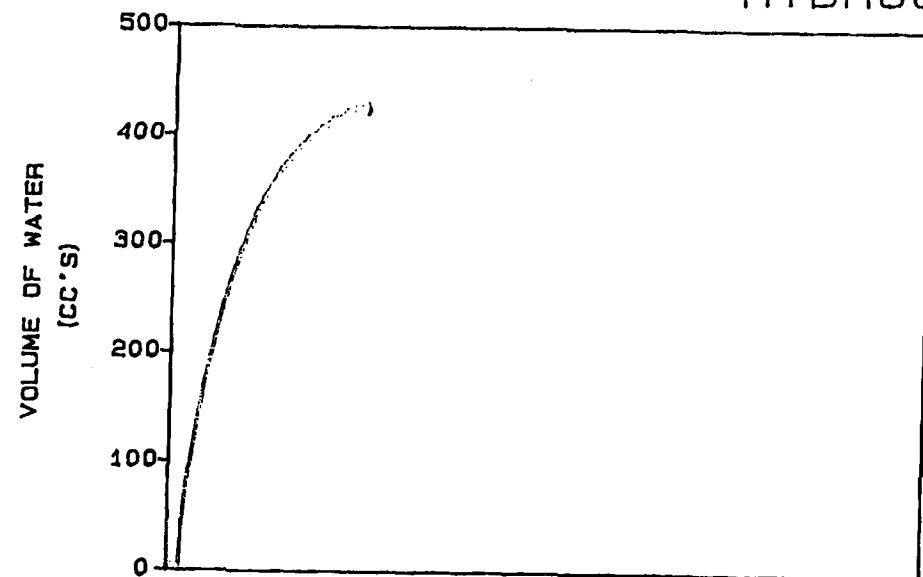
**MW-7 SLUG TEST ANALYSIS – SLUG OUT**  
Kings Laboratory Blythewood, SC



## **Appendix C-2**

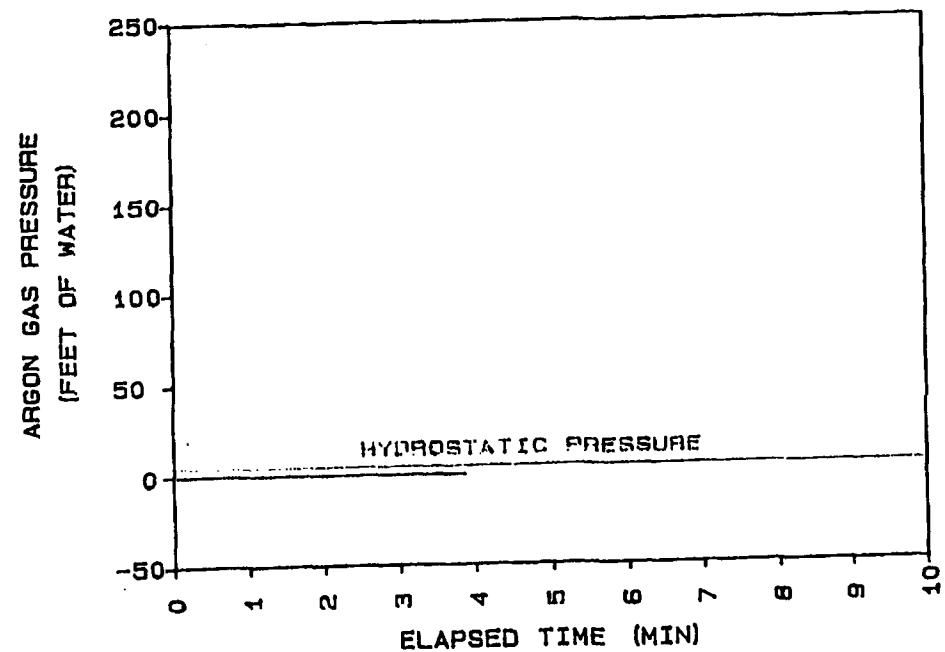
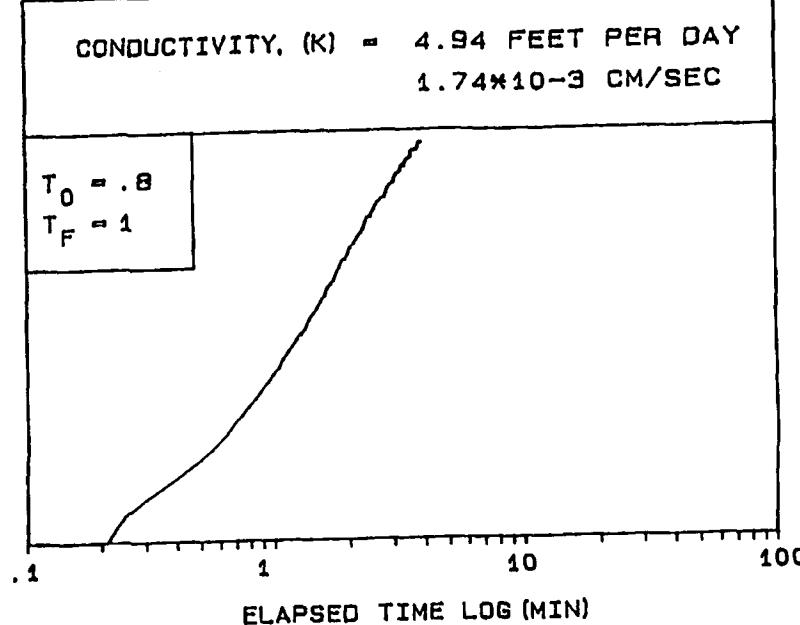
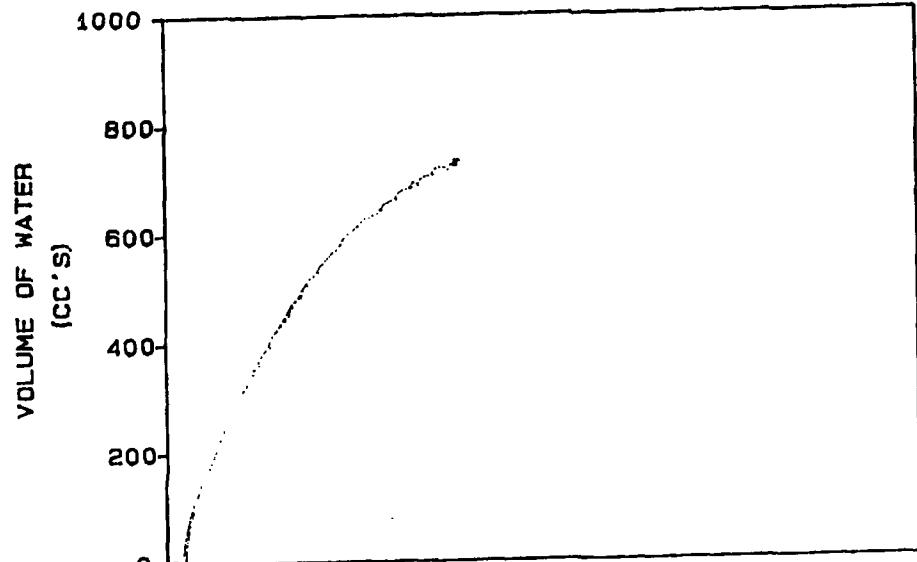
### **Hydrocone Tests**

# HYDROCONE TEST



KINGS LAB  
LOCATION... HC1-33  
TEST DATE  
10/14/92 16: 40: 51  
  
SAMPLE DEPTH (FT) 33  
GROUNDWATER DEPTH (FT) 26

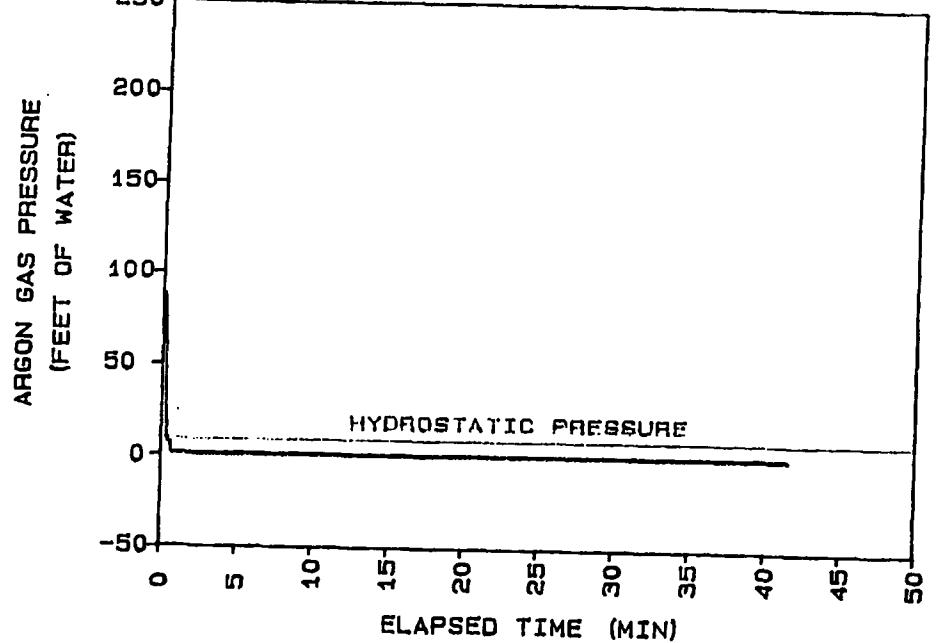
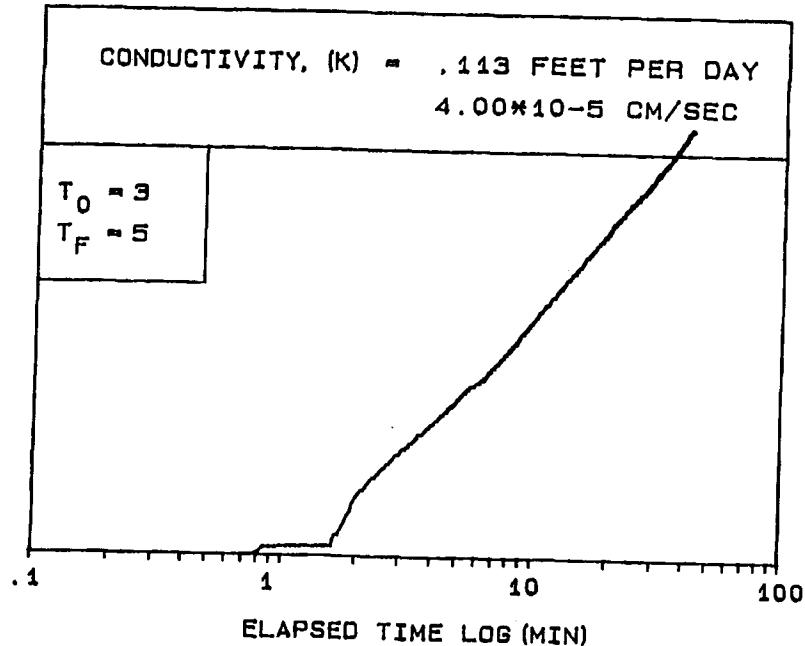
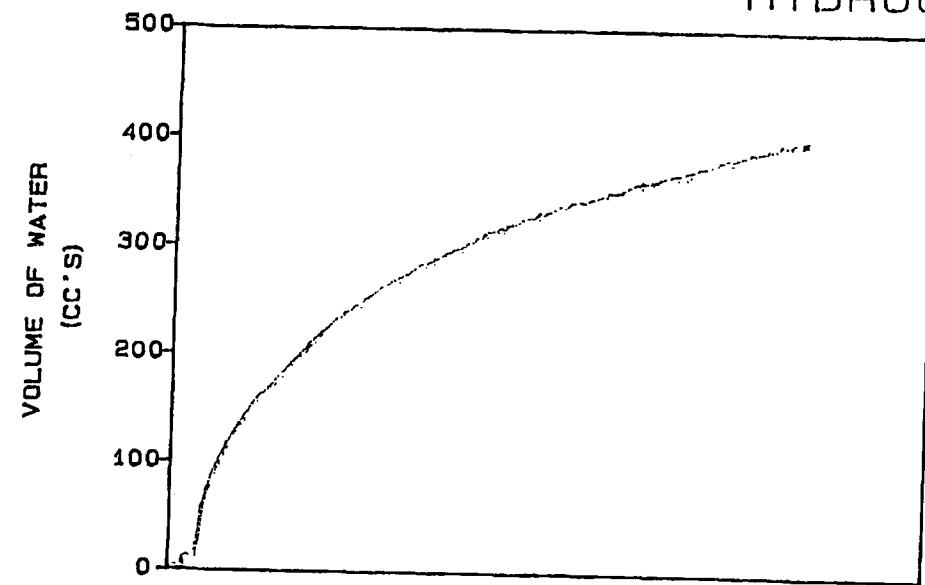
# HYDROCONE TEST



KINGS LAB  
LOCATION... HC-2  
TEST DATE  
10/15/92 10: 04: 35

SAMPLE DEPTH (FT) 32  
GROUNDWATER DEPTH (FT) 27

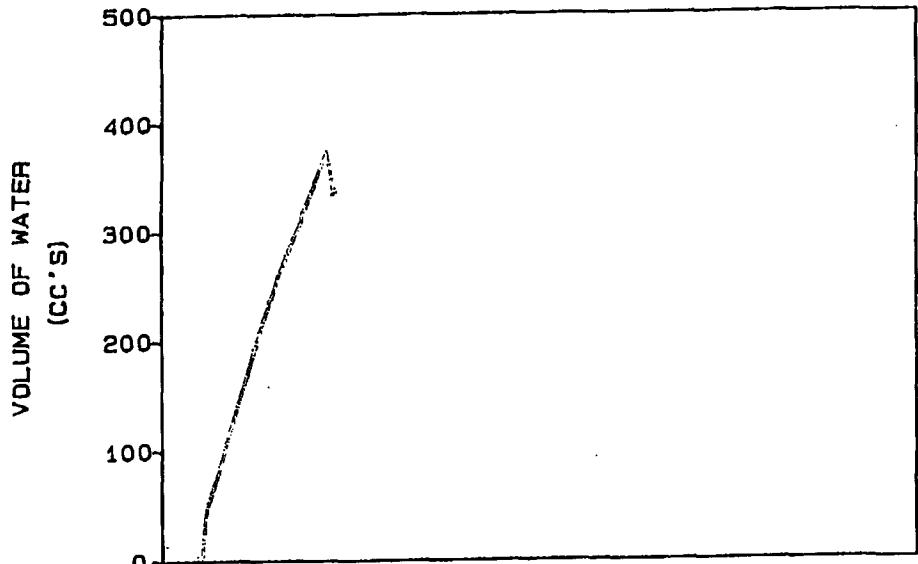
# HYDROCONE TEST



KINGS LAB  
LOCATION... HC3-33  
TEST DATE  
10/15/92 11: 01: 15

SAMPLE DEPTH (FT) 33  
GROUNDWATER DEPTH (FT) 24

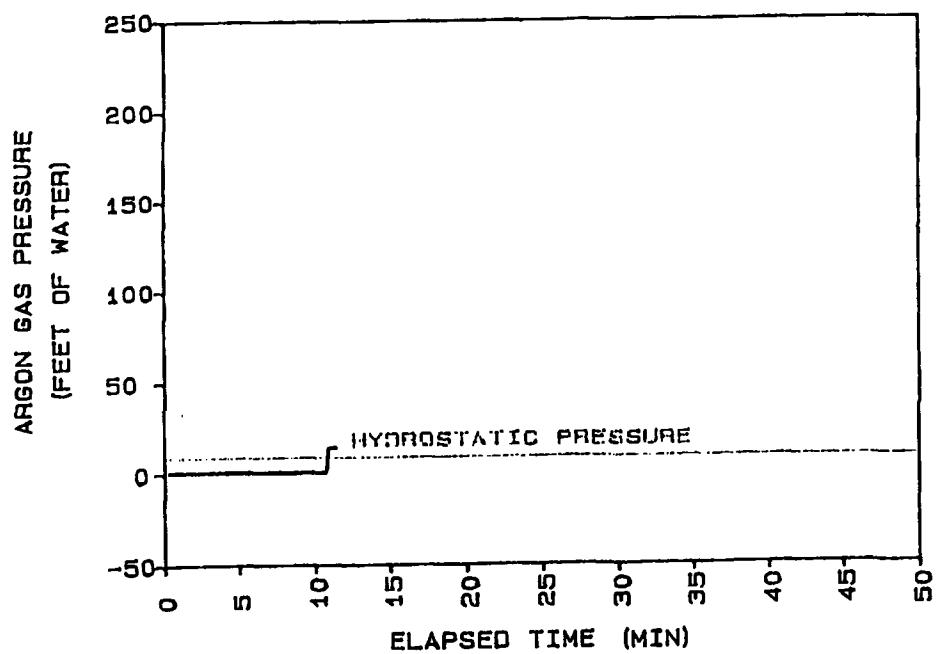
# HYDROCONE TEST



CONDUCTIVITY, (K) = .260 FEET PER DAY  
 $9.19 \times 10^{-5}$  CM/SEC

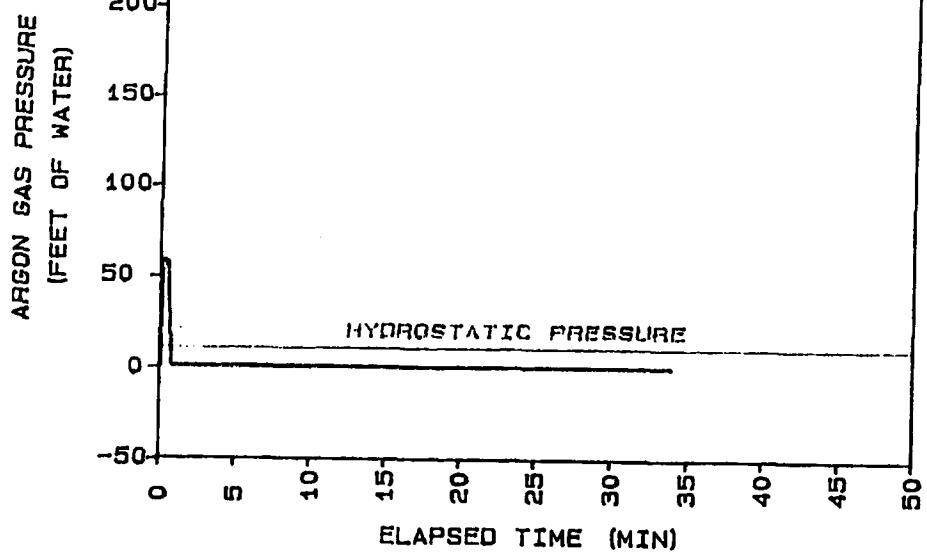
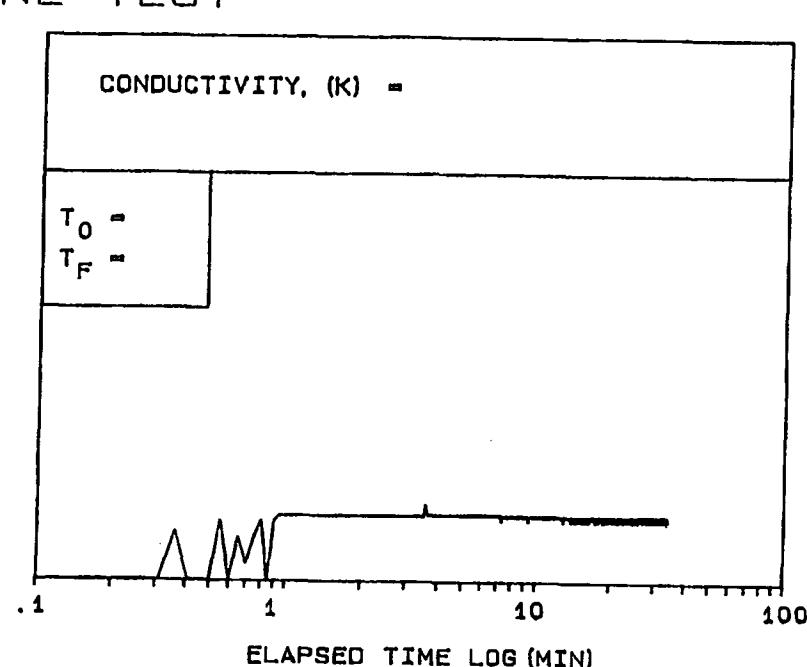
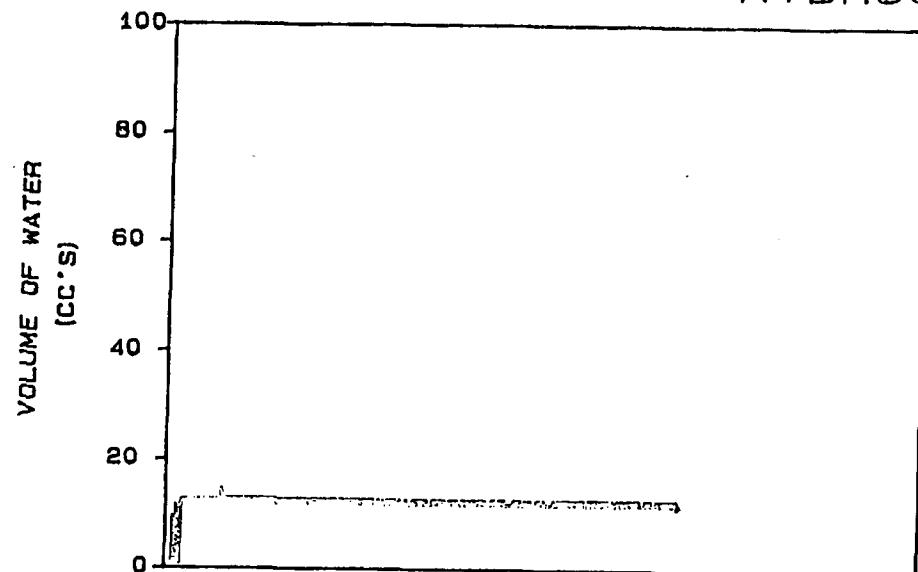
$$T_0 = 3$$
$$T_F = 5$$

.1      1      10      100  
ELAPSED TIME LOG (MIN)



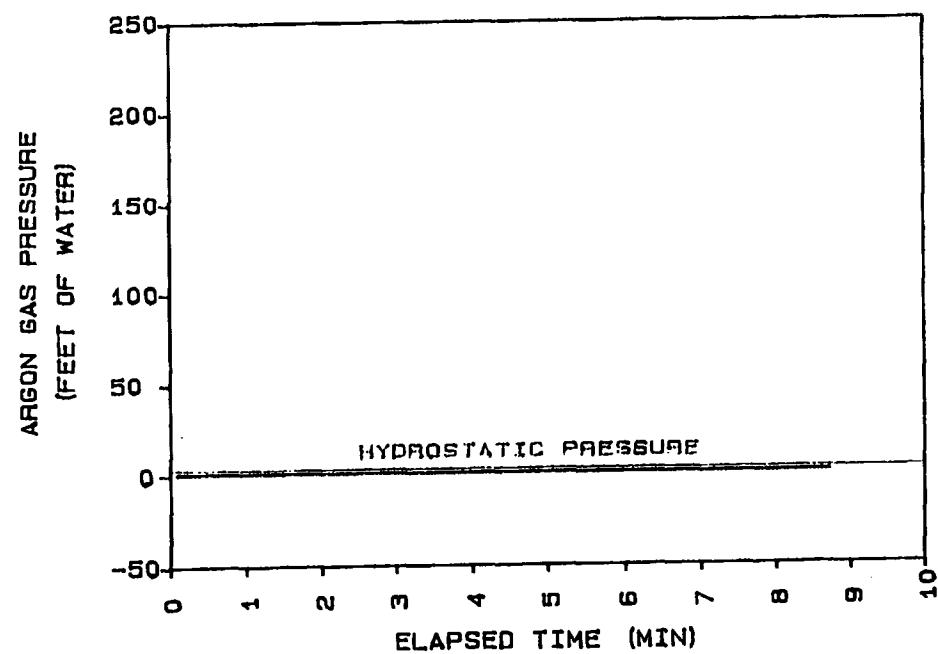
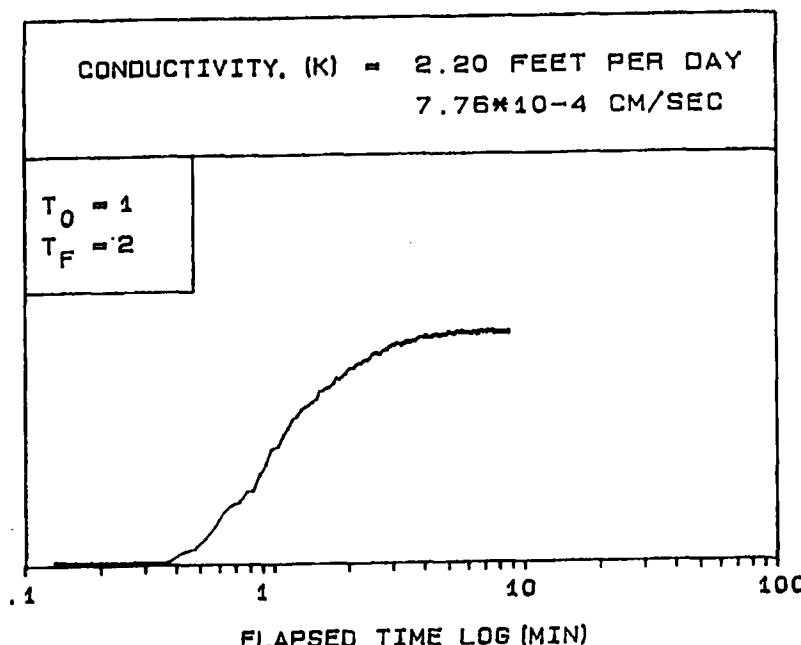
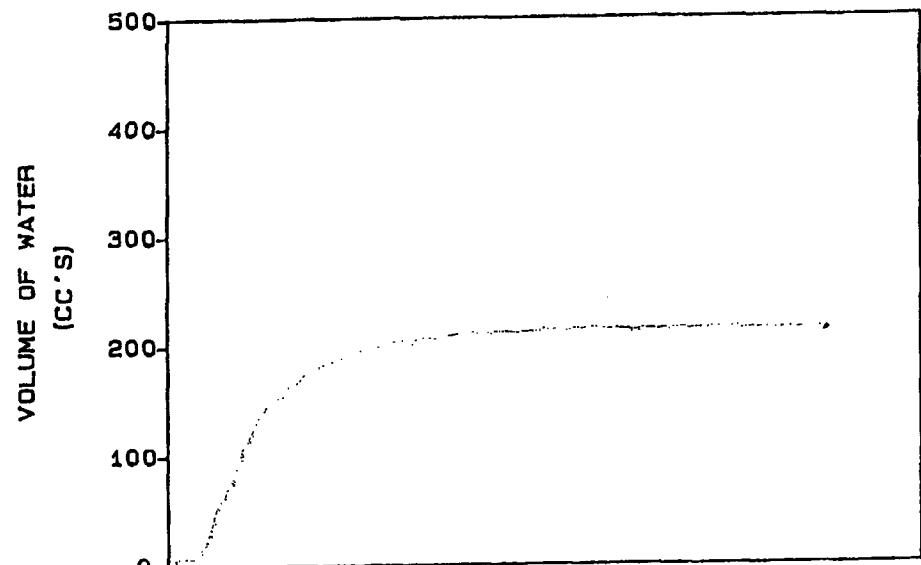
KINGS LAB  
LOCATION... HC4-16  
TEST DATE  
10/13/92 16: 16: 14  
SAMPLE DEPTH (FT) 16  
GROUNDWATER DEPTH (FT) 7

# HYDROCONE TEST



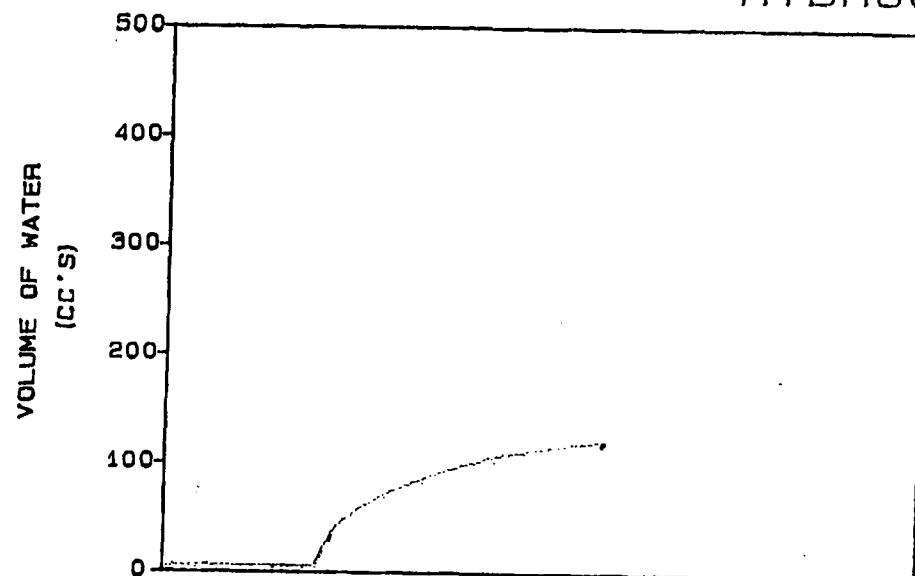
KINGS LAB  
LOCATION... HC-6  
TEST DATE  
10/16/92 10:22:07  
  
SAMPLE DEPTH (FT) 23  
GROUNDWATER DEPTH (FT) 12

# HYDROCONE TEST



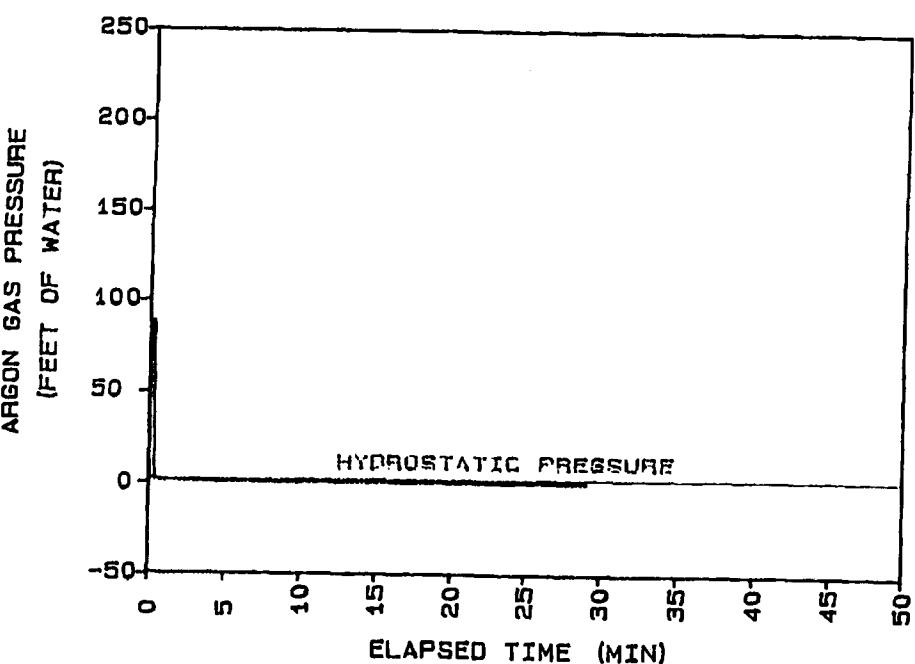
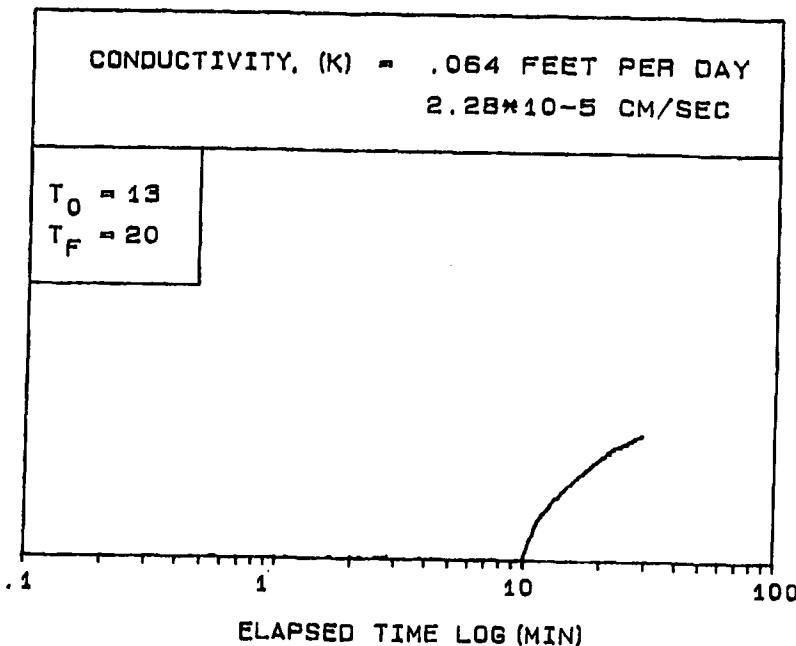
KINGS LAB  
LOCATION... HC7-33  
TEST DATE  
10/15/92 09:43:33  
SAMPLE DEPTH (FT) 33  
GROUNDWATER DEPTH (FT) 30

# HYDROCONE TEST



CONDUCTIVITY, (K) = .064 FEET PER DAY  
 $2.28 \times 10^{-5}$  CM/SEC

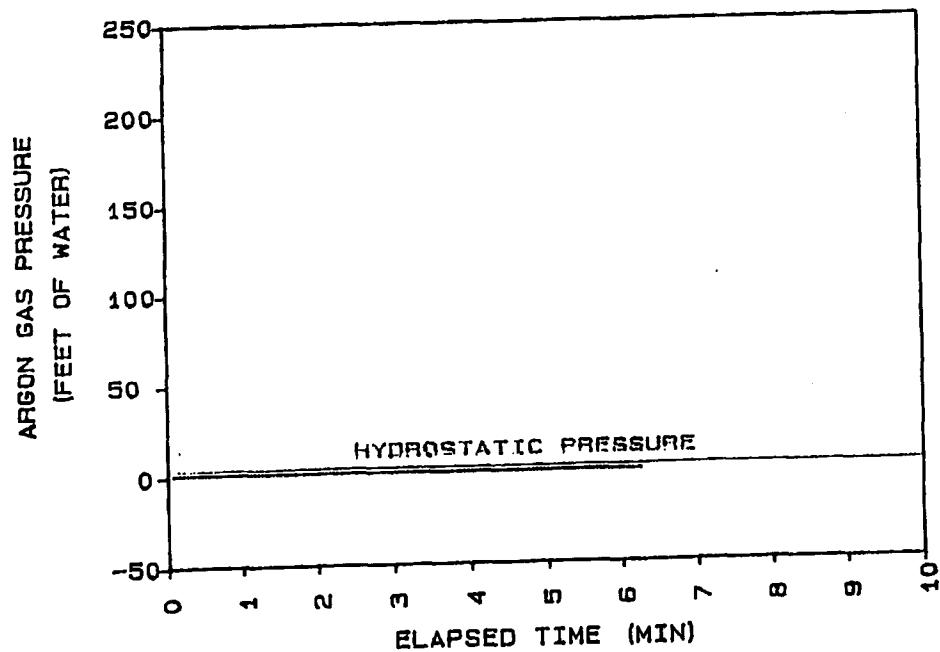
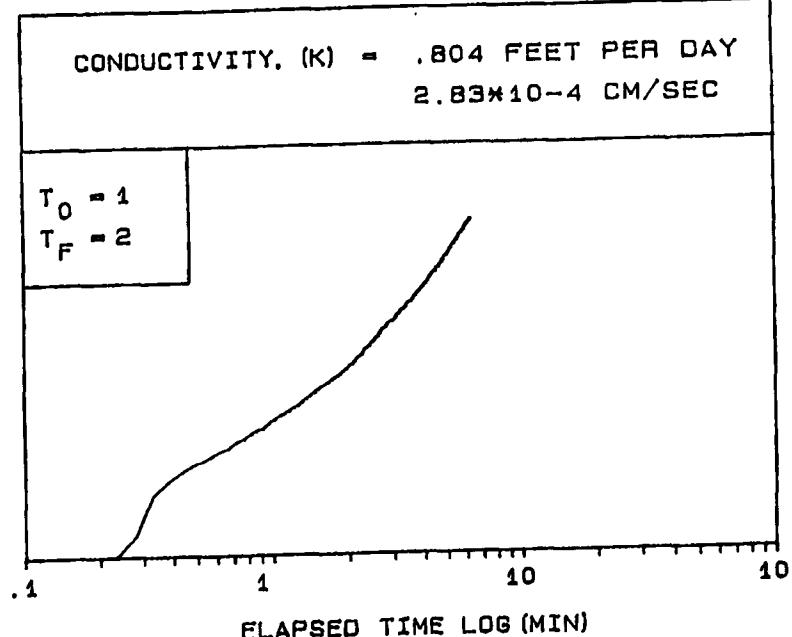
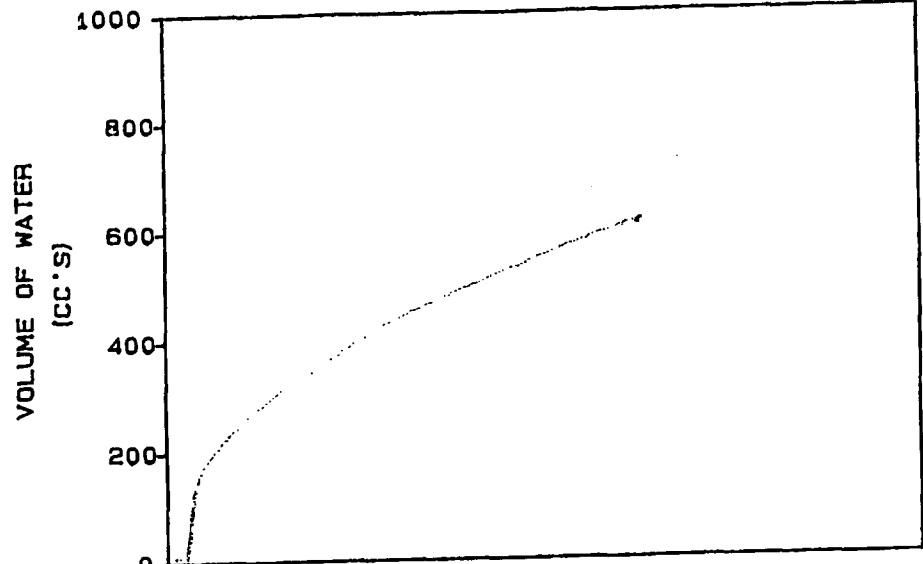
$$T_0 = 13$$
$$T_F = 20$$



KINGS LAB  
LOCATION... HCB-32.5  
TEST DATE  
10/15/92 14:33:16

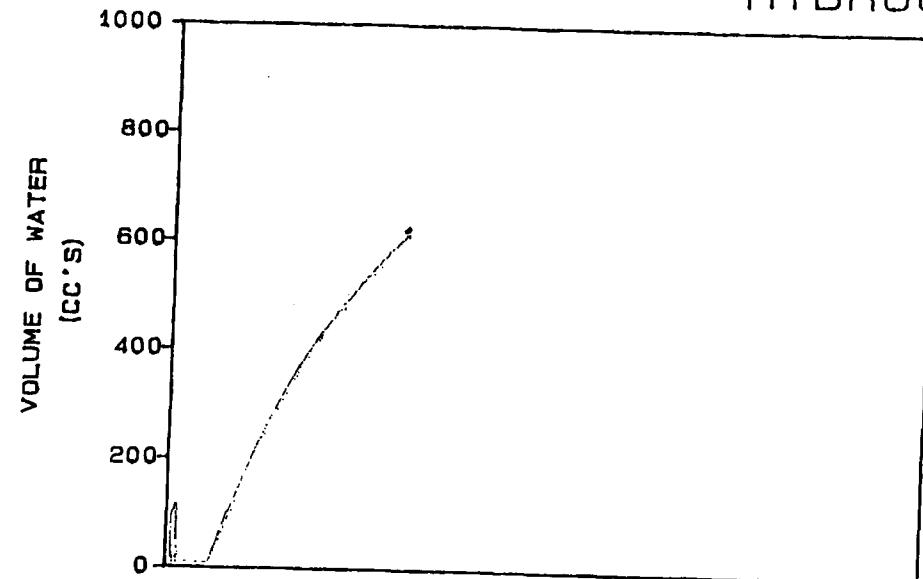
SAMPLE DEPTH (FT) 32.5  
GROUNDWATER DEPTH (FT) 30.5

# HYDROCONE TEST



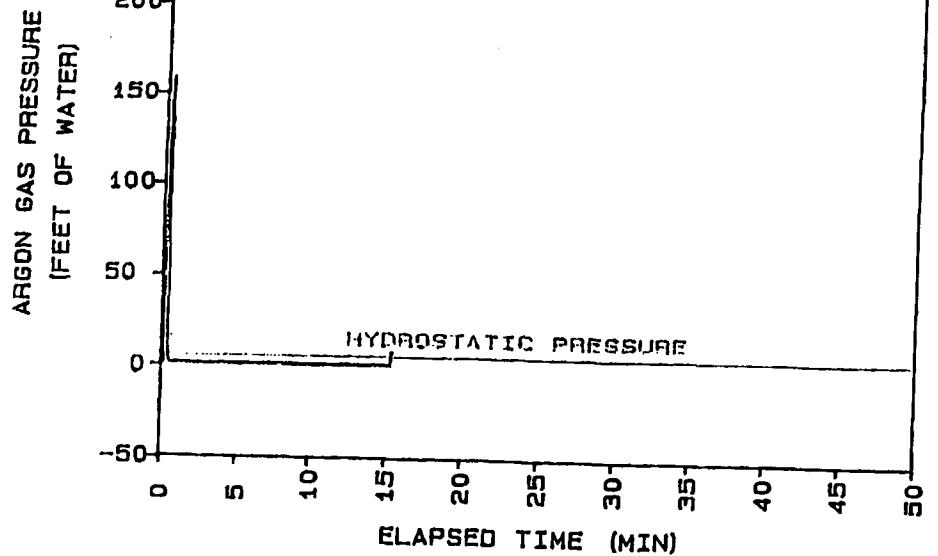
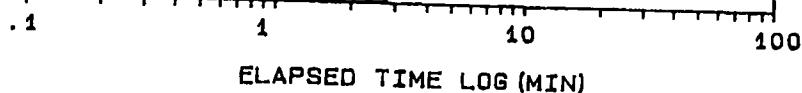
KINGS LAB  
 LOCATION... HC9-27.5  
 TEST DATE  
 10/15/92 16: 52: 51  
 SAMPLE DEPTH (FT) 27.5  
 GROUNDWATER DEPTH (FT) 24

# HYDROCONE TEST



CONDUCTIVITY, ( $K$ ) = .551 FEET PER DAY  
 $1.94 \times 10^{-4}$  CM/SEC

$$T_0 = 3$$
$$T_F = 5$$

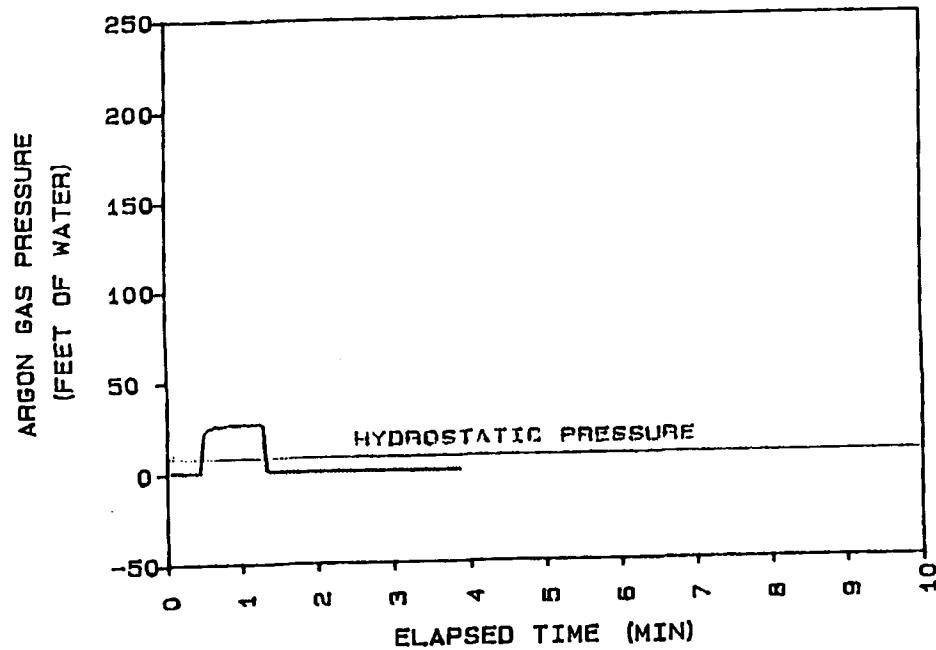
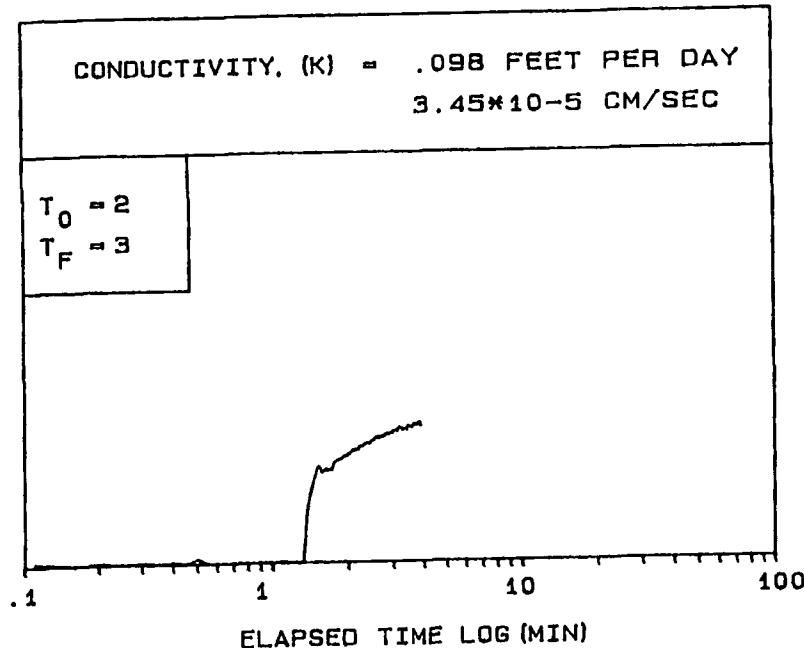
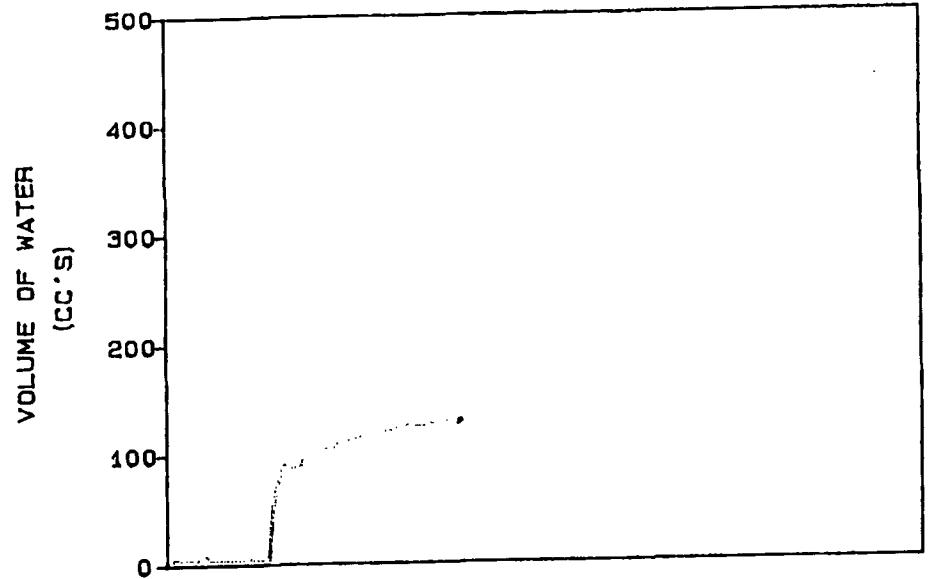


ELAPSED TIME LOG (MIN)

KINGS LAB  
LOCATION... HC10-38  
TEST DATE  
10/16/92 11:09:38

SAMPLE DEPTH (FT) 38  
GROUNDWATER DEPTH (FT) 32

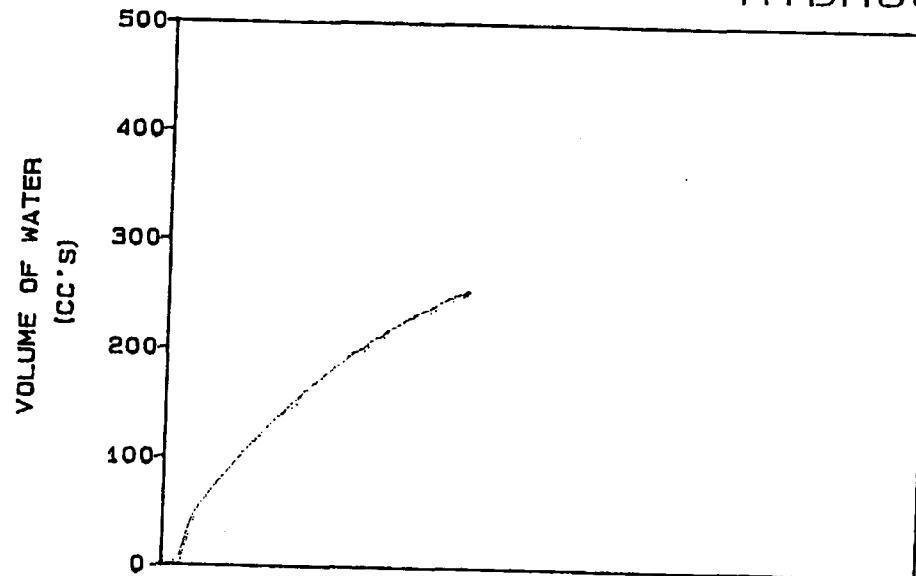
# HYDROCONE TEST



KINGS LAB  
LOCATION... HC-11  
TEST DATE  
10/17/92 10: 59: 21

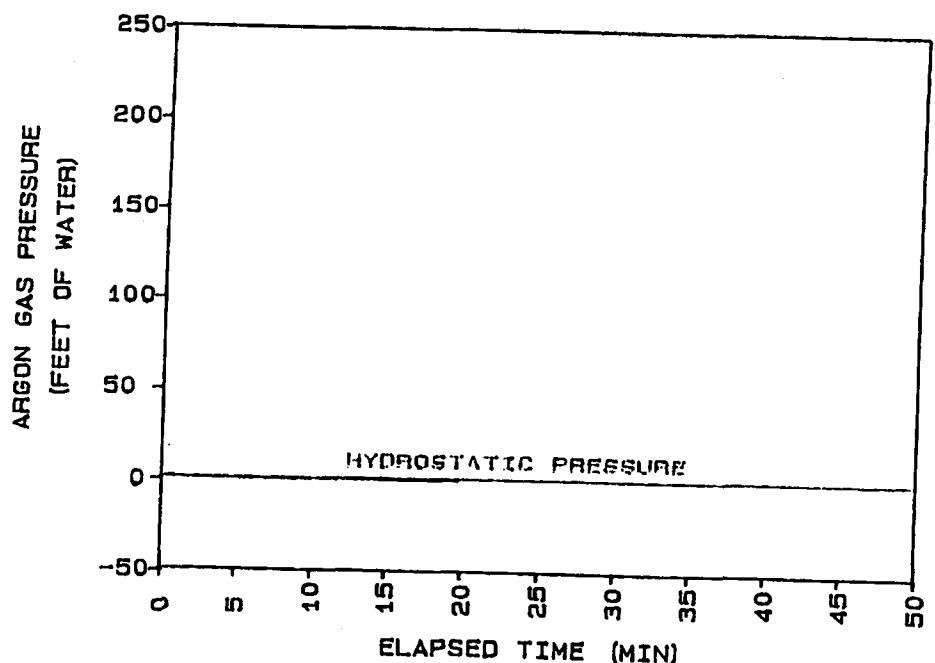
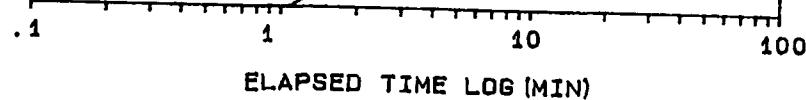
SAMPLE DEPTH (FT) 21  
GROUNDWATER DEPTH (FT) 12

# HYDROCONE TEST



CONDUCTIVITY, ( $K$ ) = .091 FEET PER DAY  
 $3.22 \times 10^{-5}$  CM/SEC

$$T_0 = 2$$
$$T_F = 4$$



KINGS LAB  
LOCATION... HC12-32  
TEST DATE  
10/17/92 16: 51: 27

SAMPLE DEPTH (FT) 32  
GROUNDWATER DEPTH (FT) 30.5

**APPENDIX D**  
**RISK MODELING OUTPUT**

**CURRENT USE: RECREATIONAL EXPOSURE  
DERMAL CONTACT WITH CHEMICALS IN SURFACEWATER  
KINGS LABORATORY**

ABSORBED DOSE (mg/kg/day) = CS \* CF \* SA \* PC \* ET \* EF \* ED/(BW \* AT)

CHEMICAL	CS (mg/l)	CF (.001 l/cm <sup>3</sup> )	SA (cm <sup>2</sup> )	PC (cm/hr)	ET (hrs/day)	EF (events/year)	ED (years)	BW (kg)	AT (ED * 365 days/year)	ABSORBED DOSE (mg/kg/day)
BENZENE	0.007	1.0E-03	4000	8.40E-04	1	156	7	21.5	25550	4.48E-08
DICHLOROBENZENE 1,2	0.002	1.0E-03	4000	8.40E-04	1	156	7	21.5	2555	1.53E-07
DI-N-BUTYLPHthalate	0.167	1.0E-03	4000	8.40E-04	1	156	7	21.5	2555	1.12E-05
TRICHLOROETHENE	0.017	1.0E-03	4000	8.40E-04	1	156	7	21.5	25550	1.14E-07

CUSWDER.SW3

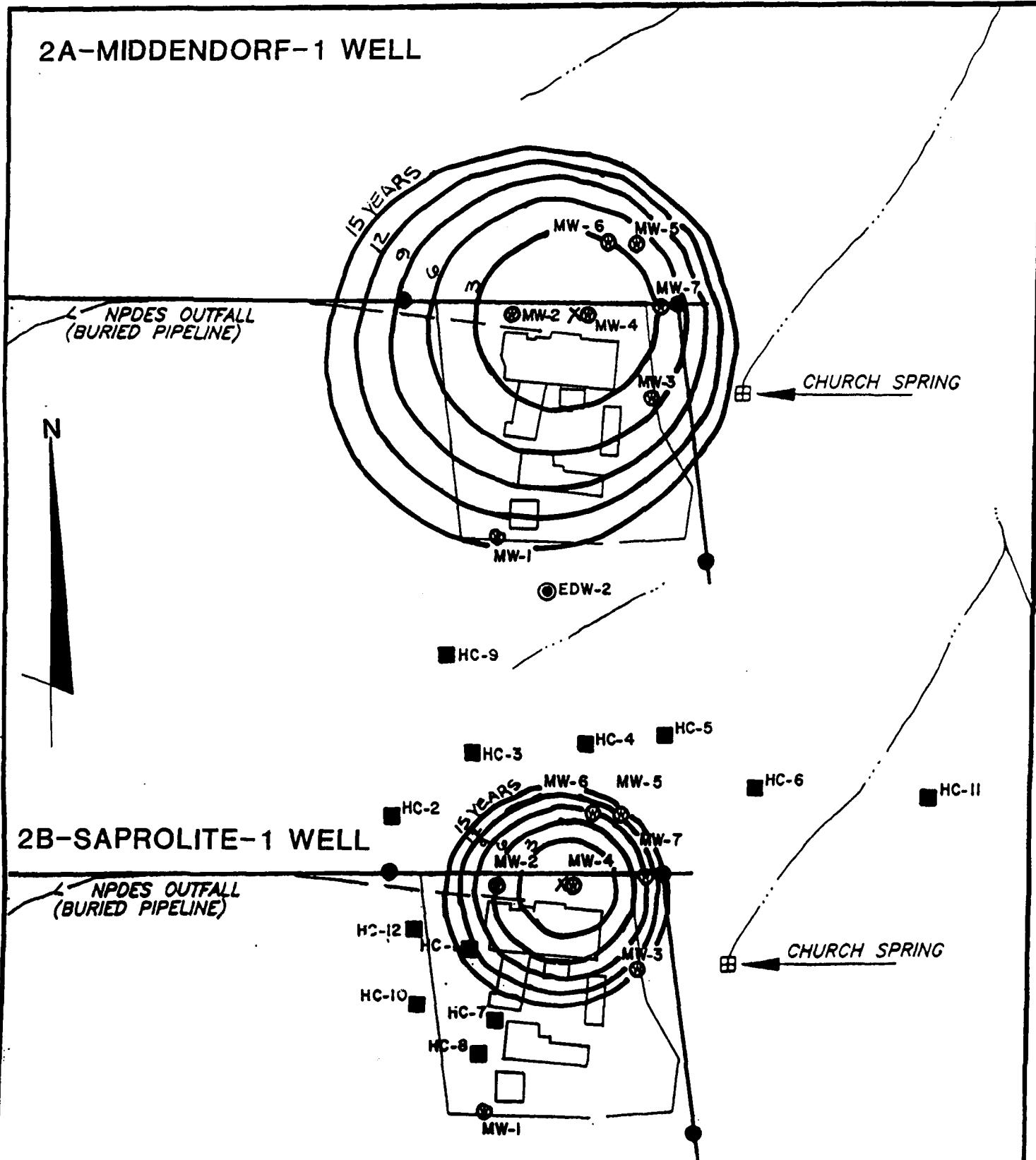
**CURRENT USE: RECREATIONAL EXPOSURE  
INGESTION OF CHEMICALS IN SURFACEWATER  
KINGS LABORATORY**

INTAKE (mg/kg/day) = CW \* IR \* EF \* ED/(BW \* AT)

CHEMICAL	CS (mg/l)	IR (liters/day)	EF (events/year)	ED (years)	BW (kg)	AT (ED * 365 days/year)	INTAKE (mg/kg/day)
Benzene	0.007	0.05	156	7	21.5	25550	6.66E-07
Chromium	0.580	0.05	156	7	21.5	2555	5.76E-04
Dichlorobenzene 1,2	0.023	0.05	156	7	21.5	2555	2.28E-05
Mercury	0.003	0.05	156	7	21.5	2555	2.58E-06
Di-N-Butylphthalate	0.167	0.05	156	7	21.5	2555	1.66E-04
Trichloroethene	0.017	0.05	156	7	21.5	25550	1.69E-06

CUSWING.WK3

## 2A-MIDDENDORF-1 WELL



CAPTURE ZONE MAPS FOR  
FIVE MODELED SCENARIOS

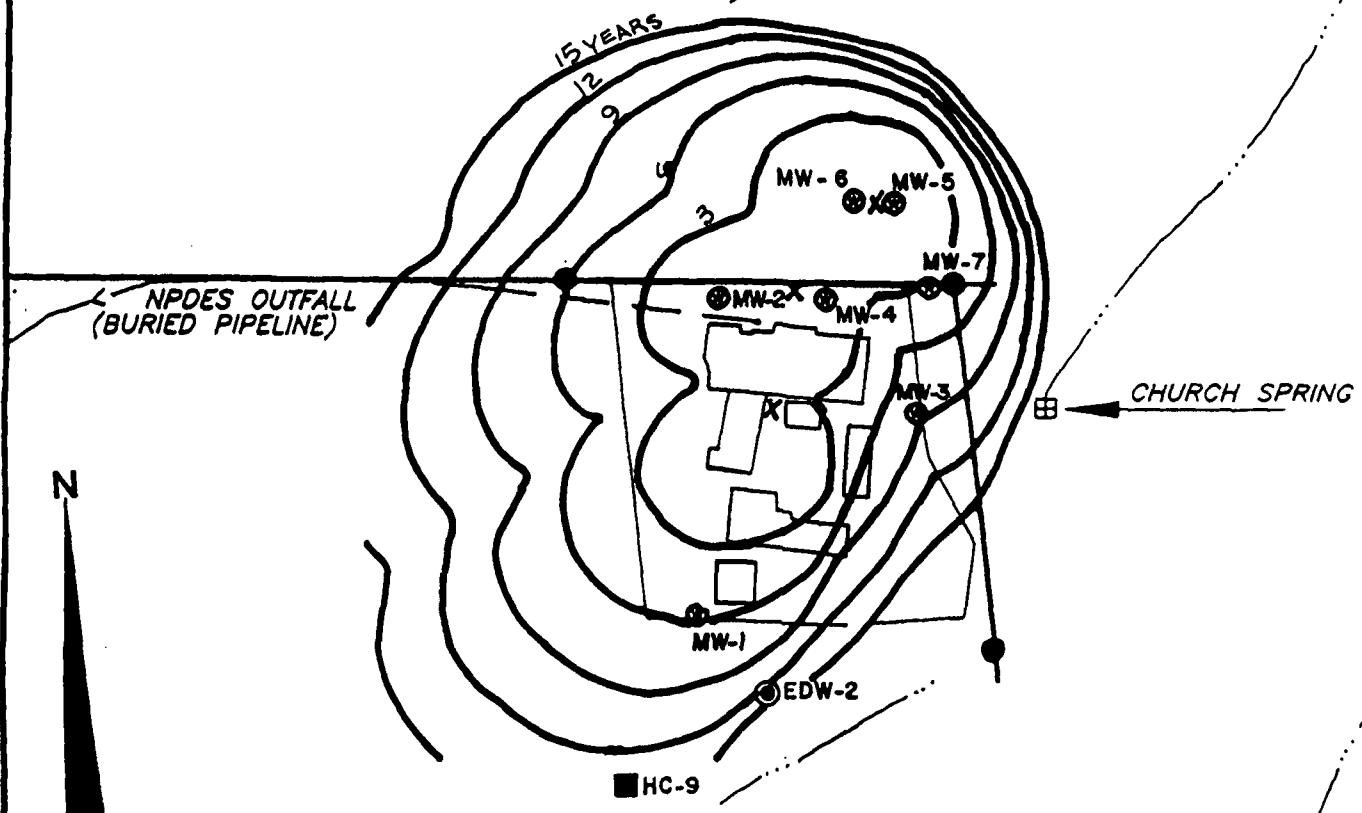
SCALE: 1':200'



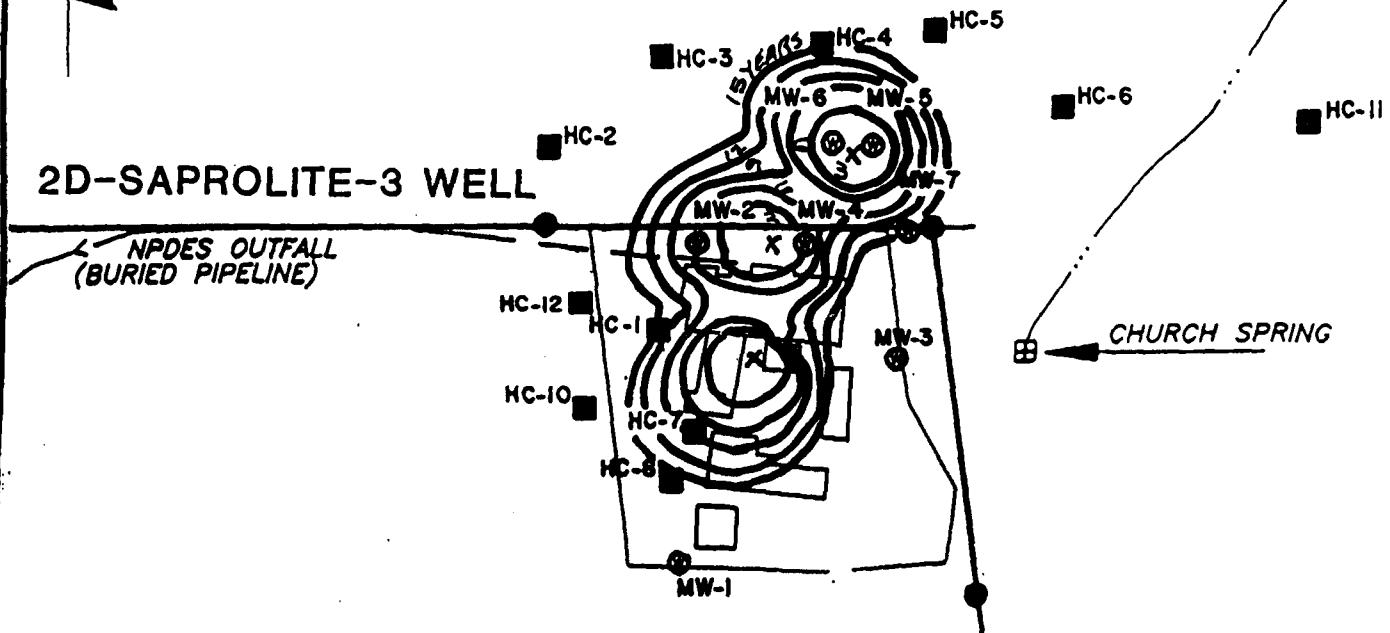
POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

PLATE 2A/2B

## 2C-MIDDENDORF-3 WELL



## 2D-SAPROLITE-3 WELL



CAPTURE ZONE MAPS FOR  
FIVE MODELED SCENARIOS

SCALE: 1':200'



POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

PLATE 2C/2D

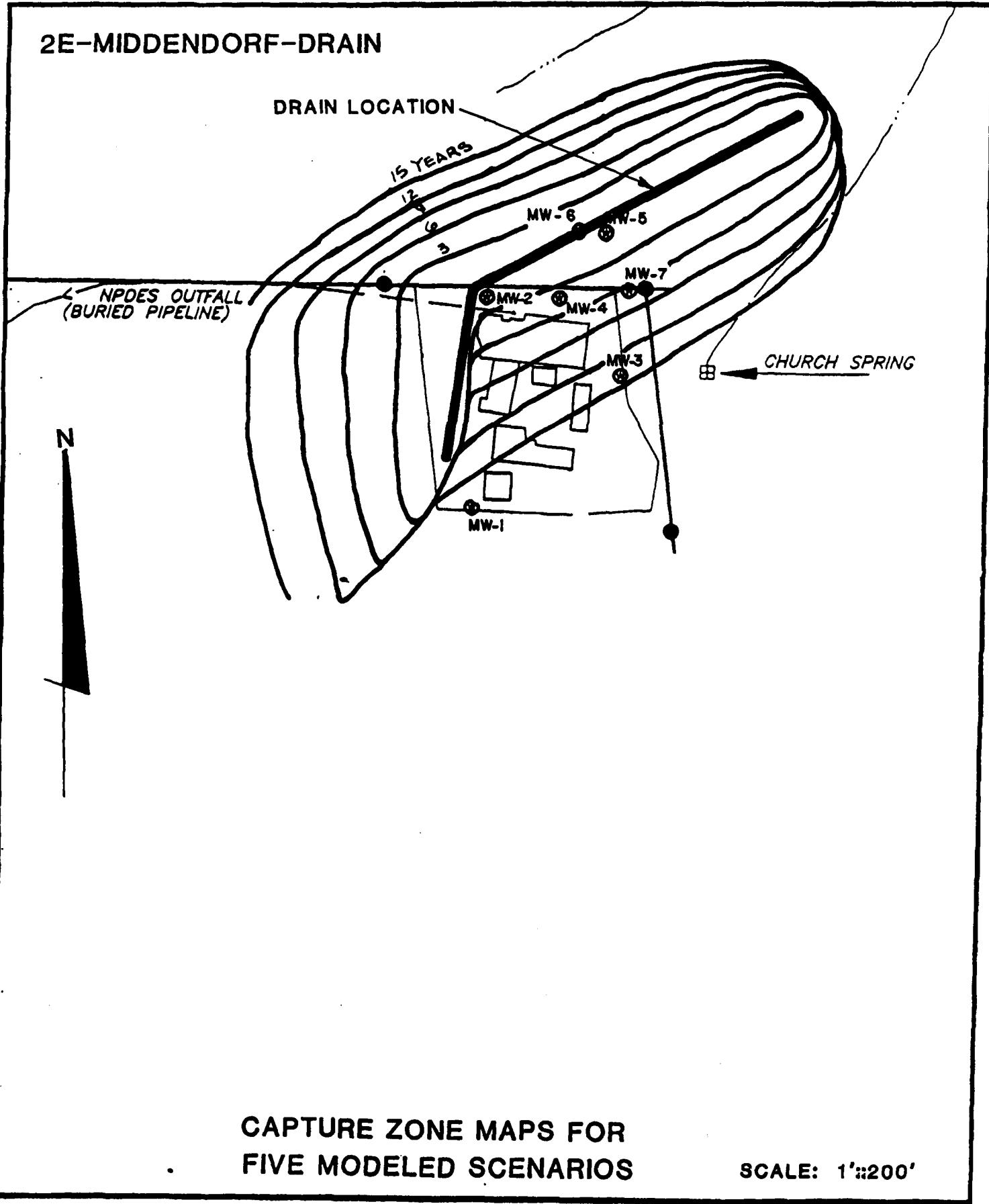
**PLATE 1**

**Project Map Showing Principal Sampling Locations and  
Other Investigation Features**

**PLATE 2**

**Capture Zone Maps for Five Modeled Scenarios**

## 2E-MIDDENDORF-DRAIN



CAPTURE ZONE MAPS FOR  
FIVE MODELED SCENARIOS

SCALE: 1":200'



POST, BUCKLEY, SCHUH & JERNIGAN, INC.  
KING'S LABORATORY, INC.  
BLYTHEWOOD, S.C.

PLATE 2E